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## Predictors of Older Adults' Confidence in Avoiding Drug Interactions

Ginalynn Cabanas Garces  
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# Walden University

College of Psychology and Community Services

This is to certify that the doctoral dissertation by

Ginalynn Garces

has been found to be complete and satisfactory in all respects,  
and that any and all revisions required by  
the review committee have been made.

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Walden University  
2025

Abstract

Predictors of Older Adults' Confidence in Avoiding Drug Interactions

by

Ginalynn Garces

MSHA, Grand Canyon University, 2014

BA, Hawaii Pacific University, 2011

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Clinical Psychology

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## Abstract

Adverse drug interactions due to polypharmacy pose a significant global health concern, particularly for older adults. Age-related physiological changes increase vulnerability to medication-related issues, with adverse drug reactions often mistaken for normal aging. These misdiagnoses can lead to prescribing cascades and preventable harm. Despite evidence supporting comprehensive medication reviews and clinical guidelines, their application remains inconsistent across healthcare settings. This quantitative archival analysis aimed to identify critical risk factors—such as age, sex, race, education level, medication complexity, drug interaction discussions, number of prescriptions, and overall physical and mental health—that influence older adults' confidence in avoiding drug interactions. Grounded in the Health Belief Model and Self-Efficacy Theory, the study examined how health motivation and self-efficacy shape medication management. Using multiple linear regression and secondary data, the analysis revealed that communication with healthcare providers significantly enhanced confidence in managing medications and avoiding adverse drug interactions. Physical and mental health were also strong predictors of confidence. These findings underscore the importance of patient-provider communication, health literacy, and interdisciplinary collaboration in minimizing adverse drug interactions. The study highlights the potential for positive social change by improving medication management, reducing hospitalizations, and enhancing health outcomes for older adults through targeted interventions and comprehensive care strategies.

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## Table of Contents

List of Tables .....	vi
List of Figures .....	vii
Chapter 1: Introduction to the Study.....	1
Introduction.....	1
Why the Study Needs to Be Conducted.....	1
Positive Social Change .....	4
Preview of Major Sections.....	5
Background of the Problem .....	5
Gap in Knowledge .....	6
The Need for This Study.....	6
Problem Statement.....	7
Evidence of Current and Relevant Problems .....	7
A Call for Improvement in Medication Management in Older Adults.....	8
Gap in Research Literature .....	10
Purpose of the Study .....	10
Research Question and Hypothesis.....	12
Theoretical Framework.....	12
Social Cognitive Theory .....	12
Social Cognitive Theory About the Study’s Approach .....	13
Conceptual Framework.....	14
Health Belief Model.....	14

Health Belief Model in Relation to the Study’s Approach .....	15
Nature of the Study .....	15
Definitions.....	16
Assumptions.....	18
Scope and Delimitations .....	19
Internal and External Validity.....	19
Limitations .....	20
Measures to Address Limitations.....	20
Significance of the Study .....	21
Potential Contributions of the Study to Advance Clinical Practice .....	21
Potential Implications for Positive Social Change.....	23
Summary .....	23
Chapter 2: Literature Review .....	26
Literature Review.....	26
Synopsis of Current Literature and Organization of the Review .....	26
Preview of Major Sections.....	31
Literature Search Strategy.....	32
Theoretical Framework.....	33
Social Cognitive Theory .....	33
Social Cognitive Theory in Existing Literature and Research.....	35
Social Cognitive Theory Rationale for Choice of Theory .....	37
Conceptual Framework.....	39

The Health Belief Model .....	39
Seminal Researchers on the Health Belief Model Concept .....	39
The Health Belief Model in Previous Studies .....	40
The Health Belief Model and Sociodemographic Factors .....	42
Literature Review Related to Key Variables and Concepts.....	42
The Issue of Polypharmacy and Adverse Events.....	44
Adverse Drug Effects During Transition of Care .....	45
Over the Counter Medication Concerns .....	47
Drug Metabolism in Older Adults .....	47
Lack of Patient Adherence and Complicated Drug Regimens .....	48
Lack of Health Literacy Assessment and the Role of Healthcare Providers .....	49
Communicating OTC Discussing Adverse Drug Reactions .....	52
Aging, Beliefs and the Physical and Mental Health of Older Adults .....	55
Summary and Conclusions .....	56
Chapter 3: Research Method.....	58
Research Design and Rationale .....	58
Methodology .....	59
Population and Sample Size.....	59
Sampling Procedures .....	59
Archival Data Access and Power Analysis.....	60
Instrumentation and Operationalization of Constructs .....	61
Data Analysis Plan .....	62

Research Question .....	62
Threats to Validity .....	64
Ethical Procedures .....	65
Summary .....	65
Chapter 4: Results .....	67
Introduction .....	67
Data Collection .....	67
Time Frame and Recruitment .....	68
Discrepancies in Data Collection .....	68
Baseline Descriptive and Demographic Characteristics .....	69
Sample Representativeness and External Validity .....	70
Data Preparation.....	71
Modifications to Variables.....	72
Univariate Analysis and Covariates .....	72
Results of the Study .....	73
Descriptive Statistics.....	74
Evaluation of Statistical Assumptions .....	74
Report Statistical Analysis Findings .....	76
Post Hoc Analysis.....	76
Additional Statistical Tests .....	77
Interpretation of Statistical Findings.....	77
Relevance to Research Question.....	77

Practical Significance.....	77
Summary .....	78
Chapter 5: Discussion, Conclusions, and Recommendations .....	80
Introduction.....	80
Interpretation of the Findings.....	80
Limitations of the Study.....	82
Recommendations.....	83
Implications.....	86
Individual Level.....	86
Family Level .....	86
Organizational Level.....	86
Societal/Policy Level .....	87
Theoretical and Methodological Implications .....	87
Recommendations for Practice .....	87
Conclusion .....	88
References.....	89
Appendix A: Power Analysis.....	108
Appendix B: Power Analysis for Minimally Detectable Effect Size .....	109

## List of Tables

Table 1. Criteria for Avoiding Drug Interactions .....	52
Table 2. Archival Variables Selected for Secondary Analysis .....	62
Table 3. Data Collection Timeline and Response Rate .....	68
Table 4. Discrepancies and Adjustments in Data Collection.....	69
Table 5. Descriptive and Demographic Characteristics of the Sample .....	70
Table 6. Comparison of Sample Demographics With Population Characteristics .....	71
Table 7. Results of Univariate Analysis and Covariate Justification.....	73
Table 8. Descriptive Statistics of the Sample .....	74
Table 9. Multiple Linear Regression Results.....	76

## List of Figures

Figure 1. Histogram of Mahalanobis Distance Depicting Multivariate Outliers .....	72
Figure 2. Histogram of Regression Residuals.....	75
Figure 3. Normal P-P Plot of Regression Standardized Residuals .....	75

## Chapter 1: Introduction to the Study

### **Introduction**

The topic of this study includes exploring the prevalence, mechanisms, and consequences of adverse drug interactions in older adults. As individuals age, their bodies undergo a series of physiological and pathological changes that profoundly influence the metabolism of medications. With a growing aging population, the incidence of multimorbidity rises, leading to an increased reliance on prescribed drugs (Varghese et al., 2021). Although MacRae et al. (2021) and Taghy et al. (2023) noted the absence of a universally agreed-upon definition, *polypharmacy* generally refers to the simultaneous use of numerous medications, commonly defined as five or more. Adverse drug interactions in older adults can be particularly concerning due to factors such as altered pharmacokinetics and pharmacodynamics, increased susceptibility to drug-related adverse events, and the presence of multiple chronic conditions requiring complex medication regimens. Understanding and managing these interactions is crucial to optimize therapeutic outcomes and minimize the risk of harm in this vulnerable population.

### **Why the Study Needs to Be Conducted**

The study on polypharmacy in older adults, 65 years and over, is needed because this age group is prone to an occurrence of drug–drug interactions as a result of multimorbidity, complexity of multiple healthcare visits, and complicated treatment processes. The study considered findings on older adults’ ongoing age-related changes

that increase the risk of adverse drug effects and mortality. This study examines how prescribed medications can harm patient adherence and quality of life.

To this day, the prevalence of polypharmacy in this population at both hospital admission and hospital discharge has risen significantly. Christopher et al. (2022) found that the use of multiple medications includes forgetfulness, lack of deprescribing, lack of communication, poor understanding, and limited awareness of inappropriate medications among older adults related to medication use problems. Past research has confirmed the association between polypharmacy, falls, cognitive impairment, and mortality (Doumat et al., 2023). This study informs the need for medication revisions, and a multidisciplinary approach is needed. Researchers Varghese et al. (2021) emphasized the significance of effectively managing patients on target medications to reduce unplanned hospitalizations. The authors highlighted the severe repercussions of preventable adverse drug effects due to inappropriate medication use in this demographic. Their findings underscored the importance of screening for drug interactions while also considering patients' goals of care and life expectancy to ensure medication appropriateness.

Adverse drug reactions due to unsafe care are now estimated to be the 14<sup>th</sup> leading cause of morbidity and mortality globally (World Health Organization, 2019). Several studies have shown that the use of multiple medications is associated with a broad range of adverse clinical events (Chang et al., 2020). Varghese et al. (2021) reported that polypharmacy in older adults is often overlooked mainly because the symptoms can be confused with normal aging or other medical conditions.

The topic of polypharmacy is especially alarming because a high medication burden may not be optimal for this population due to the extreme case of polypharmacy (Unlu et al., 2020). This research aligns with the current study's focus on the effects of the number of medications for older adults and how it relates to inappropriate medication use. Baryakova et al. (2023) outlined various factors that may contribute to older adults choosing not to adhere to their prescribed medication regimens, such as the complexity of managing multiple medications, cognitive decline leading to forgetfulness, low self-efficacy, affecting motivation and health beliefs, and inadequate communication with healthcare providers regarding medication use. Failure to follow medication regimens in the realm of psychology examines the challenges faced by older individuals dealing with multiple health conditions and medications. This study focused on assisting individuals in participating in decision-making, motivating them, and empowering them to choose how to tackle challenging situations, as well as addressing the effects of stress to enhance medication adherence. The recommendation includes collaboration between medical professionals and psychologists to improve adherence (Gruszczyńska et al., 2020). Older adults who decide not to take medications tie back to the study's conceptual framework, the health belief model. In this model, self-care behaviors (purposeful actions) are considered essential determinants of self-management of medications in older adults, indicating that self-efficacy was positively associated with health beliefs (A. Zhang et al., 2022).

## **Positive Social Change**

This study significantly impacts patient medication adherence due to understanding medication labels and information leading to non-adherence. In addition, A. Zhang et al.'s (2022) research ties to the study because it provides insight into older adults' ability to make an informed decision about their medication regimens, particularly addressing negative adverse effects and having the confidence to avoid drug-drug interactions. The significance of this study is to underscore the critical role of safety culture within healthcare settings. By addressing safety culture, healthcare professionals can enhance communication channels between patients, their families, and healthcare providers. Moreover, communication facilitates the identification of potential adverse drug effects, thereby mitigating risks and promoting patient safety. Fostering a robust safety culture empowers healthcare teams to optimize patient care and outcomes while minimizing the likelihood of medication-related harm. The study's findings provided a rigorous extension of existing literature using longitudinal data and a large nationally representative sample.

Polypharmacy is a significant topic, and its relation to adverse drug-drug interactions carries significant implications for social change. This study contributes to existing research by highlighting how interventions to address polypharmacy and implement preventive measures can enhance clinicians' capabilities in identifying psychological distress among older adults and gaining a more profound insight into their functional status. This study encourages a more integrated approach to identifying and potentially preventing the root causes of negative health outcomes linked to

polypharmacy by fostering collaboration among healthcare providers. Thus, this research aimed not only to improve individual patient care but also to advance broader healthcare practices that could substantially improve the well-being of the elderly population.

This chapter explores major, commonly identified risk factors for polypharmacy in adults 65 and over, explicitly examining the confidence in avoiding drug interactions. These identifying factors include age, sex, education level, medication complexity, drug interaction communication, and the number of prescriptions. Lastly, evidence-based intervention methods to improve health outcomes for older adults are discussed.

### **Preview of Major Sections**

The contents presented in Chapter 1 are an introduction, background of the problem, problem statement, the purpose of the study, research question, hypothesis, the theoretical and conceptual framework for this study, nature of the study, definitions, assumptions, scope, and delimitations, limitations, significance of the study and summary.

### **Background of the Problem**

Medication management among older adults aged 65 and above, with multiple health conditions simultaneously, is complex. Despite the increasing longevity observed in this demographic, the prevalence of medication usage remains notably high, reflecting the necessity of pharmacological interventions in managing their health (Owusu et al., 2023). However, alongside the potential benefits, there is a significant risk of adverse drug effects, as highlighted by Woo et al. (2020), which can lead to severe illness or even death among older adults. Thus, understanding and addressing the complexities of

medication management in this population is crucial for ensuring their overall well-being and quality of life. This imperative has been widely acknowledged in the research literature. What is known in the literature is that adults aged 65 and older frequently take medicinal herbs and other dietary supplements, a practice they may not discuss with their healthcare providers (Ruscin & Linnebur, 2021). According to Sile et al. (2023), the concurrent use of both herbal medicines and conventional medications increases the risk to patient health, potentially leading to various side effects and risks of interactions. This highlights the importance of open communication between older adults and their healthcare providers to ensure safe and effective medication management. Although researchers have investigated this issue, very little research examines the predictors of older adult's confidence in avoiding drug interactions.

### **Gap in Knowledge**

This gap in practice underscores a comprehensive guideline to identify the risk of polypharmacy in older adults.

### **The Need for This Study**

The results of these studies indicate the need to address appropriate prescribing regimens. A growing body of literature on patients' lived experiences with medications highlights the need for clinicians to better understand medication-related problems from the patient's perspective (Nicosia et al., 2020). This gap must be addressed to inform interventions about older adults' problems and challenges with their medications successfully (Nicosia et al., 2020). This study reported that pharmacists echoed patients' concerns about communication and patient-provider relationship. Nicosia et al. (2020)

identified that most pharmacists shared experiences with patients uncomfortable discussing medication problems with their physicians or whose physicians did not have adequate time to ask or address them. One pharmacist explained that sometimes patients disclose things they do not tell their doctor (Nicosia et al., 2020).

### **Problem Statement**

In this study, the central focus revolved around addressing the research problem of polypharmacy and the prevalence of drug-drug interactions among older adults. With polypharmacy on the rise among this demographic, it presents significant challenges to our healthcare system (Barrio-Cortes et al., 2023). Dahal and Bista (2023) emphasized the urgency of understanding and mitigating this issue, highlighting its implications for patient safety and healthcare delivery. Thus, investigating and resolving this research problem is crucial for advancing clinical practice and public health initiatives. The problem this study focused on is how healthcare professionals will address the issue of polypharmacy in older adults in community dwellings.

### **Evidence of Current and Relevant Problems**

Many physicians and medical students lack communication skills (Mohd Salim et al., 2023). Communication skills include professionalism, information content, verbal, non-verbal, and para-verbal communication skills, environment, and visual communication in this age group (Mohd Salim et al., 2023).

Polypharmacy in older adults appeared in numerous articles, prompting the area of concern for the elderly taking multiple medications and suffering from serious adverse drug effects. This phenomenon has become a recent and current problem in the literature

because it highlights the growing complexity and challenges associated with medication management in this demographic. In a recent 2021 study, D.Wang et al. found that polypharmacy contributes to cost-related concerns about medications and the lack of autonomy over medication regimens. Keine et al. (2019) found evidence that the mean duration of physician visits in the United States is 21.07 minutes, most of which is spent discussing a person's current health and not on their medication regimen.

Given the level of medication complexity, polypharmacy continues to increase with the possibility of prescribing cascades. That occurs when one drug is prescribed to treat the adverse effect of another drug, and that adverse effect could be interpreted as an underlying problem or a new disease (Zahlan et al., 2023). One of the confounding issues worldwide is that polypharmacy is practiced quite often. Current studies have shown that the transition of care between hospital and home or institutional settings like a nursing home is a common source of medication errors, presenting a significant problem that puts older adults at risk for polypharmacy (Varghese et al., 2021). This is predominant because patients start new medications and stop previous ones, and as a result, cause medication errors that result in negative adverse health outcomes (Varghese et al., 2021). Older adults consume two to nine medications daily, making this age group the largest consumer of medications compared to other age groups (Sinha et al., 2021).

### **A Call for Improvement in Medication Management in Older Adults**

Management of patient medication regimens can be complex for older adults with multiple health conditions (Halli-Tierney et al., 2019). Other documented studies on polypharmacy are associated with inappropriate medication use, which, in turn,

contributes to consequences such as geriatric syndromes (e.g., falls, cognitive declines, and urinary incontinence), causing a discrepancy in medications already prescribed (Wong, 2020). Wong (2020) suggested improvements in clinical and medication management and individualized treatment. The study's result may be used to address the risks of inappropriate medication therapies and reduce the risk of overprescribing.

The importance of individual care goals is the current functioning level, social support, life expectancy, values, and individual preferences and values (Wong, 2020). Another contributing factor of polypharmacy can also result from multiple subspecialist physician prescribers that lack communication between overlapping medication regimens (Halli-Tierney et al., 2019). Ali et al. (2022) discovered that various polypharmacy interventions, including those led by multidisciplinary teams, pharmacists, physicians, and residential care staff, significantly reduced inappropriate prescribing and improved medication adherence. However, the impact on clinical outcomes and quality of life varied across interventions, showing inconsistent results.

An approach of deprescribing medications is a method of reducing the risk of polypharmacy, moving in the direction of managing medication regimens, and improving patient outcomes. Clinicians believe it is a complex process (Reeve et al., 2022). Despite many clinicians expressing confidence in deprescribing, it remains a complex endeavor, leading to fewer engaging in this practice regularly (Robinson et al., 2024). Contrary to expectations, Keller et al. (2024) found that interventions addressing polypharmacy failed to enhance mortality rates, healthcare quality, or quality of life. This suggests insufficient evidence to advocate widespread implementation of such interventions. Moreover, these

interventions showed minimal effectiveness in curbing inappropriate prescribing practices, with evidence quality ranging from low to very low.

### **Gap in Research Literature**

Consequently, there is little evidence of an association between polypharmacy-related interventions and reduced important clinical and healthcare use outcomes (Keller et al., 2024). Researchers Zhou et al. (2023) noted a critical gap in managing drug-drug interactions in clinical practice in older adults. The literature looked at independent risk factors associated with adverse drug reactions. Many practitioners rely on the reports from their patients about their medication. Current studies have discussed deprescribing as a therapeutic intervention (Halli-Tierney et al., 2019). The gap in practice is the lack of a comprehensive clinical guideline to adopt and formulate in healthcare settings to utilize as an ongoing assessment for older adults' ability to optimize medication use and assess their ability to manage their medications effectively. In a collaborative process, the collective insight of various stakeholders, including nurses, pharmacists, social workers, and patient representatives, can help identify barriers to care that affect older adults' confidence and ability to avoid harmful drug interactions. By engaging these stakeholders, we can uncover issues in medication understanding and compliance that older adults may not disclose voluntarily (McCarthy et al., 2022).

### **Purpose of the Study**

The purpose of this quantitative project was to identify the following risk factors altogether: age, sex, race, education level, the complexity of medication, drug interaction discussions, number of prescriptions, and overall physical and mental health (independent

variables), accounting for the variance in older adults' confidence in avoiding drug interactions (dependent variable). This comprehensive study focuses on these terms and explains evidence-based intervention methods detailing patient safety and motivating behavioral factors, comprising the health belief model and the self-efficacy theories. The gap in practice is that clinical practices do not have a comprehensive guideline that assesses the ongoing appropriateness of medication use in older adults, integrating patients' self-efficacy to explain self-confidence in patients' ability to avoid harmful drug reactions confidently.

This study is intended to improve older adults' lives by reducing drug interactions in both in-patient and out-patient clinics worldwide, enhancing their overall quality of care, and promoting safer medication management practices. The study can provide the public with real-world studies, especially those in the care of the geriatric population; the project seeks to increase awareness of polypharmacy issues. Its overarching goals include preventing unwanted hospitalizations, decreasing instances of polypharmacy, and exploring current cost-effective, evidence-based intervention methods. This study explored several strengths of studies that support using a multidisciplinary team approach in reducing polypharmacy, targeting perceived barriers, promoting self-care and awareness, and increasing patient self-efficacy. Identifying perceived threats prompts people to take action to prevent illness and increase confidence in reducing perceived adverse drug effects in older adults. Once professionals identify the presence of possible polypharmacy, they could initiate the discourse with other professionals to refrain from overprescribing. Integrating patients' health decisions into their care plan and promoting

positive self-efficacy could improve health literacy, medication management, and adherence. On a significant note, many bodies of studies have proven that adverse drug effects are preventable.

### **Research Question and Hypothesis**

The research question addressed in this study is as follows:

RQ: To what extent do age, sex, race, education level, the complexity of medication, drug interaction discussions, number of prescriptions, overall physical health, and overall mental health account for variance in confidence in avoiding drug interactions?

*H<sub>0</sub>*: The set of predictors accounts for the variance in confidence in avoiding drug interactions.

*H<sub>1</sub>*: The set of predictors does not account for the variance in confidence in avoiding drug interactions.

### **Theoretical Framework**

#### **Social Cognitive Theory**

The theoretical framework used for this study begins with the social cognitive theory. The social cognitive theory originated in the early work of Albert Bandura in the 1960s, with the central tenet of the social cognitive theory used in this study being the concept of self-efficacy. According to Bandura (1995), the central hypothesis of self-efficacy is the individual's belief in their capability to perform a behavior. A basic premise of this concept is that people learn not only through their own experiences but also by observing the actions of others and the results of those actions (Mukhalalati et al.,

2022). The social cognitive theory explains a person's self-confidence in their ability to take action and persist in that action despite obstacles and or challenges, which is especially important for influencing one's health behavior and health-related outcome.

### **Social Cognitive Theory About the Study's Approach**

The research question centered around the following risk factors that affect self-efficacy: age, sex, race, education level, complexity of medication, drug interaction discussions, and number of prescriptions, overall physical and mental health. The theoretical framework of social cognitive theory's self-efficacy explains how cognitive processing and decision-making shape our intentions to act and behave towards an inspired goal. Bandura (2001) suggested that people form expectations about outcomes by observing the relationships between environmental events in their surroundings. This enables people to dictate their immediate environment and to shape and regulate the present to fit a desired future (Bandura, 2001). People adopt courses of action likely to produce positive outcomes and generally discard those that bring unrewarding or punishing outcomes (Bandura, 2001). I focused on the self-confidence of older adults, which involves self-confidence in managing one's health behaviors and avoiding harmful drug interactions.

This process requires an individual's ability to manage their complex health condition. This theory relates to the study's approach, emphasizing that the process transcends the mere reception of self-care, health information, and education. Within this framework, self-efficacy emerges as the foremost predictor of medication management, medication adherence, and positive outcomes facilitated by communicative and health-

literate-seeking behaviors. Self-management behavior stands as the cornerstone for effectively overcoming barriers to care.

## **Conceptual Framework**

### **Health Belief Model**

This study also integrated the health belief model as the conceptual framework. The health belief model originated with social psychologists Rosenstock and his colleagues in the 1950s. The central hypothesis of the health belief model is used to explain (preventative) health behaviors (Rosenstock, 1974). Munuo and Masika (2024) proposed that at least three factors influence the perception of a person's health behavior threat: (a) general health values, which include interest and concern about health; (b) specific health beliefs about vulnerability to a particular health threat; and (c) beliefs about the consequences of the health problem. Thus, a person's motivation to undertake a preventative path depends on perceived susceptibility, perceived benefits, perceived barriers, cues to action, and self-efficacy (Alyafei & Easton-Carr, 2024).

The description of the conceptual framework that grounds this study is the health belief model, which considers different perceptions, including perceived susceptibility to acquiring a health condition, perceived severity of the condition and its consequences, perceived barriers to engaging in the recommended behavior, perceived benefits of engaging in the recommended behavior, and perceived cost of engaging in the recommended behavior. The health belief model addressed in this study focuses on individuals' knowledge, attitudes, and beliefs. The basis for this model is to help people assess and manage their health problems because health behavior is impacted by the

beliefs or perceptions that an adverse health condition can be avoided. The health belief model was chosen for this study because previous use of the health belief model was found effective in self-medication behaviors related to medication management (Gharouni et al., 2020).

### **Health Belief Model in Relation to the Study's Approach**

The choice to confidently avoid adverse drug effects might depend on beliefs about perceived outcomes of behavioral changes. This behavior could also be influenced by the individual's attitudes toward the behavioral change and whether they understand the perceived severity of the adverse effects of these medications, which could result in behavioral modification. Attitudes toward medications are linked directly to a perceived need for drug treatment. Finally, the health belief model affects an individual's attitudes and behaviors. Its use likely impacts the community's understanding of polypharmacy, explains health behaviors and assists providers in promoting positive health practices. Integrating the study's approach and key research question, it seeks to elucidate how these factors influence older adults' confidence in avoiding drug interactions.

### **Nature of the Study**

This quantitative investigation employed a correlational research approach, leveraging pre-existing archival data. The rationale behind this choice is the availability of a convenient sample from the dataset compiled by Malani et al. (2017), focusing on participants aged 65 and above. This dataset originates from the United States National Poll on Healthy Aging, which includes demographic information such as age, education, gender, and race/ethnicity. The data were collected through surveys conducted by phone

and online questionnaires, ensuring a diverse representation of older adults across various socioeconomic backgrounds and geographic regions in the United States. This study is intended to explain individual self-confidence in avoiding drug interactions as a result of polypharmacy. This study aims to furnish healthcare professionals with factors associated with and identifying high-risk elements to mitigate patient polypharmacy.

Through this study, I also sought to foster self-confidence and self-awareness regarding one's health, empowering individuals to take proactive measures to prevent adverse drug effects. Malani et al.'s (2017) data were collected through a questionnaire study addressing senior health concerns that were easily accessible to the public. With this in mind, I employed a multiple linear regression to explore the correlation between the independent variables: age, sex, race, education level, medication complexity, discussions on drug interactions, number of prescriptions, and overall physical and mental health. These variables served as predictors to elucidate the relationships with the study's dependent variable: confidence in avoiding drug interactions among older adults. The chosen design methodology offered the most comprehensive understanding of whether age, sex, race, education level, medication complexity, drug interaction discussions, number of prescriptions, and overall physical and mental health collectively contribute to an individual's confidence in avoiding harmful drug interactions in older adults.

### **Definitions**

The following is a brief listing of operational terms and phrases that were considered ambiguous that were used throughout this study:

*Adverse drug reactions:* An adverse drug reaction is an injury resulting from the use of a drug. It includes harm caused by the drug (adverse reaction or overdose) and harm from the use of the drug (including dose reduction and discontinuation of drug therapy). It may also result from medication errors during prescribing, transcribing, dispensing, administering, adherence, or monitoring a drug (Wong, 2020).

*Drug-drug interactions:* Drug-drug interactions occur when one drug interferes or diminishes the effect on another, causing a pharmacological activity (McQuade & Campbell, 2021).

*Health literacy:* Health literacy is the degree to which individuals can obtain, process, and understand basic health information and services needed to make appropriate health decisions (National Institutes of Health, 2021).

*Medication literacy:* Medication literacy involves the cognitive and social skills required for individuals to access, understand, communicate, calculate, and interpret medication-related information to make informed decisions (Gentizon et al., 2022).

*Multidisciplinary collaborative team approach:* Multidisciplinary collaborative medication review by the team, including pharmacists and physicians, in partnership with patients. The multidisciplinary collaborative team approach focuses on reducing the medication burden, potentially reducing the harms of unnecessary polypharmacy (Ali et al., 2022).

*Multimorbidity:* Multimorbidity is the co-occurrence of two or more chronic medical conditions in one person (Head et al., 2021).

*Older adults:* Older adults are generally described as 65 and older (National Institute of Health, 2024).

*Pharmacodynamics:* Pharmacodynamics is what the drug does to the body or its response to the drug; it is affected by receptor binding, post-receptor effects, and chemical interaction (Ruscin & Linnebur, 2021).

*Pharmacokinetics:* Pharmacokinetics is what the body does to the drug, including absorption, distribution across body compartments, metabolism, and excretion (Ruscin & Linnebur, 2021).

*Polypharmacy:* Polypharmacy is taking several medications, usually five or more per day, and administering more medicines than those that are clinically reasonable, indicating needless or unwanted drug use (Sinha et al., 2021).

*Potentially inappropriate medications:* Potentially inappropriate medication is a drug for which the risk of adverse events outweighs the clinical benefits (Wong, 2020).

### **Assumptions**

It was assumed that collecting and synthesizing the archival secondary data from Malani et al. (2017) over the specified timeframe was adequate to conduct this study. Furthermore, it was also assumed that the data collected from the Inter-University Consortium for Political and Social Research (ICPSR) archival data would provide the appropriate amount of data to the public. Moreover, it was assumed that the type of survey received from consumers was similar in content and presumed accurate interpretation of the data. Additionally, it was assumed that the public, health care providers, policymakers, and advocates on issues related to health care yielded

information on age-related health issues, drugs, medications, and demographics. The panel members in Malani et al.'s (2017) study were randomly recruited through probability-based sampling. I assumed all supplemental, demographic, and other profile variables were uniformly collected. These assumptions are necessary because they serve as the basis for the research design and the chosen methodology, guiding the direction of this quantitative archival study.

### **Scope and Delimitations**

The original study and dataset included several demographic variables of interest, age, sex, race, and education level. With a focus on these variables, I sought to uncover how these elements interact to influence patients' confidence in managing their overall health, about their health. Other data points include predictor variables such as the complexity of medication, drug-drug interaction discussions, the number of prescriptions, and overall physical and mental health.

### **Internal and External Validity**

The survey was conducted using sampling from KnowledgePanel, a web-based probability survey. Panel members were randomly recruited through probability-based sampling. The study represented the U.S. population with a measurable accuracy level and the hard-to-reach adults. The data also contained scores based on the respondent's demographics and predictor variables that account for avoiding drug interactions. These were all specific research problems that were addressed in this study.

This study included a convenience sample size of total respondents of older adults 65 and over 1,065 participants. The research design limited the ability to make inferences

or to generalize the elderly population, ages 65 years and over. These adults met the age criteria and currently took more than one medication. The scope of the study was designed to focus on senior health issues, considering their opinion, attitudes, and behaviors.

The study also included non-institutionalized adults residing in the United States. The study's official statistics were delivered and measured in 2017; I assumed the statistics may have changed since people's concerns and health beliefs may have changed. A potential bias could have influenced the study by over-reporting a particular race and/or ethnicity, which indicated a significantly higher number of White, non-Hispanic populations included in this study.

### **Limitations**

The dataset is publicly available, so the usual limitations, challenges, and barriers are not applicable. However, a limitation of secondary analysis is not having control of data collection or the operationalization of variables of interest, though the original study and dataset included several variables of interest. The study represented the U.S. population with a measurable accuracy level and the hard-to-reach adults. The study's official statistics were delivered and measured in 2017 and may have changed.

### **Measures to Address Limitations**

Reasonable measures to address the study's limitations were to fill in the gaps of the variables that may not have been presented in the study. An explanation of current approaches used by prior literature studies could be used to explain further and answer approaches and alternative intervention methods. Current literature findings impact the

study's approach because it supports the reasoning as to why the results of the multilinear regression have a linear relationship between the study's dependent and multiple independent variables. These identified limitations also guide future research directions and suggest alternative approaches.

### **Significance of the Study**

The significance of this project relates directly to the increase in the number of elderly patients who require effective medication management and the noted number of medications that increase the risk of adverse drug interactions as a result of polypharmacy. Medication management in older adults is significant to this study because patients are active in health literacy and awareness of complex medication regimens. Kurczewska-Michalak et al. (2021) highlighted that healthcare professionals should take proactive steps to manage polypharmacy issues, even without direct patient pressure. This entails initiating interventions related to polypharmacy management and considering the patient's perspective.

As Americans live longer, the demand for quality care for older adults will also increase. A recent 2019 study found that few health professionals are trained in geriatrics; less than 5% have geriatrics care licenses (Flaherty & Bartels, 2019). Professional education provides limited training in assessing and treating older adults with little exposure to geriatric populations (Flaherty & Bartels, 2019).

### **Potential Contributions of the Study to Advance Clinical Practice**

This project aimed to fill the gap by enhancing clinical skills, leadership, and collaboration, providing insight into organizational culture and change management. This

study also provided an understanding of older adults' current health conditions and how their actions or behaviors affected their ability to self-manage medications, highlighting individual motivating factors. In addition, this study aimed to identify barriers to care and promote autonomy, acknowledging self-efficacy in managing their health. Moreover, by enhancing the knowledge base of older adults and clinicians about drug-drug interactions and high-risk factors related to polypharmacy, this study empowers clinicians to effectively respond to drug-related issues and adverse reactions in this population, further bolstering the confidence of older adults in managing their health effectively. The knowledge base of older adults, as well as clinicians in understanding the implications of current drug-drug interactions and identifying high-risk factors associated with polypharmacy, will provide many clinicians with the basic skill set to respond to drug-related problems and adverse drug reactions in this population.

Flaherty and Bartels (2019) stated that healthcare professionals lack geriatric training in the team-based approach, clinical focus on functional status, and holistic approach to managing health, and emphasized shared decision-making by involving patients. Sinha et al. (2021) examined the raised awareness among healthcare professionals regarding the role of medication management review associated with inappropriate polypharmacy practices through the integration of training on self-medication management practices in the medical curriculum, along with proper knowledge of age-related changes in addressing the pharmacokinetics and pharmacodynamics of the human body. This project provides insights into other areas where vital skills and training require appropriate counseling to address patient concerns

about fear, focusing on a more comprehensive approach to patient evaluation and promoting effective medication management. This project also gives clinicians an awareness of the risk factors of adverse drug effects, where areas are often overlooked or undermined.

### **Potential Implications for Positive Social Change**

Improvements in inappropriate polypharmacy could also be achieved through institutions and social structures by integrating education programs, the social cognitive theory, and the health belief model to understand patients' perceived beliefs and values associated with medication use and their thoughts about current medications. Advances in technology (e.g., assistive devices, telehealth support), particularly in medication management, assist patients in addressing concerns related to medication use, contributing to potential implications for positive social change (Sproul et al., 2023). The result of this study should aid a multi-collaborative team of healthcare providers and clinicians in maximizing the benefits of drugs while reducing their risks, thus promoting the quality of life in older adults. Health education and counseling have long been a force for social change by addressing complex concerns within the healthcare system. Because a broad range of multidisciplinary healthcare teams typically care for and treat older adults, this study could improve intervention methods to help multidisciplinary healthcare team members be prepared to respond to the needs of diverse populations.

### **Summary**

Polypharmacy has many moving parts. The literature documented that one of the clinicians' struggles is understanding the prevalence and impact of various health

problems in older adults. Patient-centered care goals for older adults are critical, and the need for a comprehensive geriatric assessment is encouraged. Often, clinicians are not always aware of other medications taken by patients. Too often, older adults may be reluctant to ask questions about their health conditions and medications. Many older adults are burdened by disability and underlying physical, cognitive, and sensory limitations that require social support. The problem involves the challenge of assuring sufficient resources and effective intervention techniques to respond to the needs of our aging population. Among the challenges of caring for the health and well-being of older adults is the need to address health literacy concerns, communicate complicated, complex drug regimens, and improve quality communication between patients, clinicians, and the multidisciplinary team.

The common risk factors were assessed to help clinicians identify possible polypharmacy in older adults, where it is not always possible to identify. Too often, older adults are reluctant to express concerns and ask their providers about adverse drug effects or their health condition. An effective strategy to encourage better communication within a diverse spectrum of patients is to encourage behavioral change. This is essential to improving health outcomes and reducing unwanted health costs associated with inappropriate medication use.

This chapter addressed the patterns of perceived barriers to medical care in older adults, while practitioners can take a multifaceted approach to address and prevent adverse drug interactions. Both the social cognitive theory and the health belief model discuss the direction for predicting behavioral change and decisions, particularly in self-

care ability and improving self-management behaviors to avoid adverse drug effects and have the confidence to do so. I also assessed the geriatric care barriers that require an adequately trained primary care workforce. Special attention was shifted towards the way healthcare professionals think about care delivery. An integrated and collaborative approach to care is not limited to medical but non-medical, social services, and community providers' role in addressing complex health conditions, complex medications, and lack of education for older adults.

Chapter 2 emphasizes the concepts being studied and the literature review of the theoretical framework most applicable to this study, including Bandura's (1995) central tenet of the social cognitive theory, the conceptual framework of self-efficacy, the conceptual framework, and the health belief model with greater depth.

## Chapter 2: Literature Review

### **Literature Review**

The research problem highlighted in this study concerns the heightened risk of adverse drug reactions and interactions among older adults due to the increased number of medications typically used. The purpose of this study was to examine the potential impact of the following independent variables: age, sex, race, education level, the complexity of medication, drug interaction discussions, number of prescriptions, and overall physical and mental health on the dependent variable of avoiding drug interactions in older adults, 65 and over. The study involved a comprehensive analysis and evaluation of these variables to discern their impact on drug interaction avoidance among older adults.

### **Synopsis of Current Literature and Organization of the Review**

The first section outlines the scope of the literature findings relating to the issue of polypharmacy and adverse events in older adults, contributing factors to adverse effects of medication, concerns of drug metabolism in the aging body, and the role that healthcare providers play in identifying high-risk populations on polypharmacy and caring for the geriatric population. An overview of polypharmacy is presented, describing the link between the aging body, drug metabolism, and drug–drug interactions. This section includes discussion of the lack of research on provider training that may impact overmedication, which leads to adverse reactions and difficulties in managing medications in older adults 65 and over. This issue undermines the overall physical and mental well-being of older adults.

The theoretical framework, the social cognitive theory, and the conceptual framework, the health belief model, addressed the evolution from general systems theory to the logical constructs of social and behavioral processes associated with self-medication, health literacy, and motivating health behaviors. The theoretical framework of social cognitive theory highlights the concept of self-efficacy and, in turn, the gaps between the intention to seek critical health literacy or health education and changed behavior and the ability to avoid drug interactions. One of the barriers to self-care was identified as a lack of motivation for behavior change. The concept of self-efficacy may be the key to improving motivation and confidence in avoiding drug interaction through self-care behavior in medication management.

The theoretical framework of social cognitive theory's self-efficacy suggests that social support contributes to a dynamic, ongoing process and influences self-care behaviors (Tan et al., 2021). Given that older adults may have a lower self-efficacy compared to their young counterparts, the research question integrates the extent to which self-efficacy alters with age, sex, race, education level, the complexity of medication, drug interaction discussions, number of prescriptions, overall physical and mental health and the allocation of effort to persist in avoiding harmful drug–drug interactions. The current study added to the literature by investigating self-efficacy among older adults as they relate to the combination of risk factors associated with knowledge and confidence in avoiding drug interactions in this population. Thus, strategies within the domains should be promoted to improve the administration and efficacy of drugs prescribed to older adults.

Self-efficacy is an integral component of Bandura's (1995) social cognitive theory. This theory emphasizes the individual agents, active agents that deliberately guide individuals' behavior in an immediate environment (Bergman et al., 2019). In this study, I focused on polypharmacy and the increased risk of clinically significant potential drug-drug interactions in older adults. Bandura placed greater emphasis on efficacy as it serves a substantial value and purpose to one's well-being (Linge et al., 2021). Self-efficacy was the most critical predictor of medication management, adherence, and positive outcomes through communication and health literacy-seeking behaviors. Self-management behavior is the cornerstone to overcoming barriers to care effectively. Predictability also fosters adaptive preparedness (Bandura, 1995).

Bandura (1995) noted that self-efficacy in self-care behaviors involves more than receiving self-care health information and education; it is a practical framework that explains individual motivation, self-beliefs, performance, and capability. Bandura (1997) went on to discuss that human functioning is affected by people's beliefs. In other words, the view of human functioning is the belief that increasing age indicates declining capacity and that they do little to exploit their capabilities (Bandura, 1995). In addition, social comparison influences have been assessed regarding individual ability. Bandura (1995) suggested modeling influences go beyond setting a social standard for self-assessment. They involve transmitting knowledge and teaching practical skills and strategies for coping with environmental demands through individual behavior and expressed ways of thinking.

This project focused on contributing factors that include age, sex, race, education level, complexity of medication, drug interaction discussions, number of prescriptions, and overall physical and overall mental health that account for confidence in avoiding drug interactions in older adults. The self-efficacy theory highlights the gaps between the intention to seek critical health literacy or health education and behavior related to their ability to manage their health (Islam et al., 2023). The research aimed to elucidate the behaviors of older adults and the dynamic interplay among environmental, personal, and contextual factors, exploring how these elements influence and modify each other. Additionally, this study examined the motivational and influential factors specific to individuals, connecting these dynamic interactions to elucidate older adults' self-confidence in avoiding drug interactions. One of the barriers to self-care was identified as a lack of motivation for behavior change. Self-efficacy may be the key to improving motivation and confidence in avoiding drug interaction through self-care behavior in medication management.

Engagement in self-care behaviors was also found to have barriers to these self-care behaviors and are rendered by and associated with adverse drug effects. This theory suggests that self-efficacy and social support contribute to a dynamic, ongoing process that influences self-care behaviors (Tan et al., 2021). Individuals with higher perceived self-efficacy can motivate themselves to regularly engage in self-care behavior and overcome obstacles that prevent them from performing these behaviors (Tan et al., 2021). Individuals' attitudes and beliefs can help to explain individual health behaviors, depending on the person's values placed on goals and the actions to achieve those goals.

The health belief model is a social cognitive framework used to examine health behavior. The health belief model considers different perceptions, such as perceived susceptibility to acquiring a health condition, perceived severity of the condition and consequences, perceived barriers to engaging in the recommended behavior, perceived benefits of engaging in the recommended behavior, and perceived costs. This study used the health belief model to understand individuals' knowledge, attitudes, and beliefs. The basis for this model is to help people assess and manage their health problems because health behavior is impacted by the beliefs or perceptions that an adverse health condition can be avoided. Self-medication is an essential part of a patient's medical behavior. This is usually the first choice to treat early disease symptoms because the risk associated with misusing medication can do more harm than good.

In previous studies, the health belief model has been used to motivate individuals to choose positive health behaviors by increasing their awareness of side effects and decreasing the occurrence and severity of health complications. The health belief model was chosen for this study because previous use of the health belief model has been found effective in self-medication behaviors related to medication management (Gharouni et al., 2020). This model identifies and explains factors affecting behaviors and barriers to the perceived threat. This model also offered ways to influence these factors as they may work (Gharouni et al., 2020). For example, if an individual is to change their behavior, they first must be susceptible to a phenomenon of self-medication (perceived susceptibility) and understand the depth of related adverse effects on their life (perceived severity; Gharouni et al., 2020). Subsequently, the individual must admit the benefits of

behavioral changes and stop using medications (perceived benefits). Likewise, they should overcome existing barriers by taking action (perceived barriers).

Older adults can use medication wisely by creating a joint action plan for behavioral objectives (Gharouni et al., 2020). To accomplish this, health professionals are trained to apply the health belief model in comprehensive health centers and nursing care centers so that adherence to treatment and proper drug use improves health behaviors (Gharouni et al., 2020).

### **Preview of Major Sections**

This chapter provides a definition and criteria for avoiding drug interactions in older adults 65 and over. Chapter 2 reviews recent studies that identified polypharmacy and its adverse effect on the aging body. This study discussed two well-documented psychological theories that established a central theoretical model: the social cognitive theory and the construct of self-efficacy and the health belief model, addressing the evolution from general systems theory to the logical constructs of social and behavioral processes associated with self-medication, health literacy, and motivating health behaviors. In this section, I discuss the views on the limitations of both self-efficacy and the health belief model, including their lack of comprehensiveness and the practical implications of limited clinical consequences. Finally, the last section of this chapter concludes with a summary, presenting the knowledge identified in the literature while connecting the gaps on this subject matter.

### Literature Search Strategy

The literature review used Google Scholar, Sage Online Journals, Medline, ProQuest, Sage, PubMed, PubMed databases, books, and The National Institute of Health. The literature search focused on the following main areas: (a) *older adults 65 and over*, (b) *age, sex, race, and education level on drug-drug interactions*, (c) *medication complexity*, (d) *drug interaction discussions*, (e) *number of prescriptions on adverse drug interactions*, (f) *confidence in avoiding drug interactions in older adults*, and (g) *physical and mental health of older adults and adverse drug effects*.

Key search terms for the theoretical foundation included *Bandura's self-efficacy theory*, *Rosenstock Hochbaum's health belief model*, a combination of *self-efficacy on adverse drug effects in older adults*, and the *health belief model on adverse drug effects in older adults*. A refined search includes the following terms: *polypharmacy*, *race and gender differences*, *health literacy*, *medication errors*, *physical and mental health in older adults*, and *promoting self-medication*. I have included an early 1993 study due to the nature of the literature findings. These articles supported the independent variables and included relevant discussions relating to the search terms *drug interaction discussions* and *confidence in avoiding drug interactions in older adults*. This study focused on key search terms filtered from 2019 to 2024 to ensure current training protocols and research. Searches within this date range also included *self-efficacy*, *health belief models in medication management in older adults*, *clinical guidelines in managing adverse drug effects*, *patient engagement*, *health literacy*, and *integrating a*

*multidisciplinary team approach in the care of older adults*. All terms were searched with negative drug interactions that targeted older adults, precisely 65 and over.

### **Theoretical Framework**

The theoretical framework for this study includes the original work of Bandura's (1977) theory of self-efficacy and health belief model, which was developed in the 1950s by Rosenstock and colleagues. The logical connections between the frameworks and this study include self-efficacy, as it relates to the social and behavioral processes of self-medication. The health belief model relates to health education and motivating health behaviors. These theories guided the selection of variables in the archival data and informed the interpretation of results.

#### **Social Cognitive Theory**

Bandura's (1997) social cognitive theory explains individual learning and motivating behaviors (as cited in American Psychological Association, 2021). Central to Bandura's (1997) social cognitive theory is the concept of human agency, which operates in a reciprocal determinism that involves behavior, interpersonal factors, and the external environment (Schunk & DiBenedetto, 2023). In this view, Bandura (1997) suggested that self and society, along with internal personal factors such as cognitive, affective, and biological events, behavior, and environmental events, all interact as determinants that influence one another. Bandura (1997) emphasized the pivotal role of personal efficacy in human agency, stating that beliefs constitute the critical factor of human agency and are interwoven within a network embedded in a network of functional relationships with other factors that operate to manage various realities. These include individual cognition,

emotional states, experiences, and personal goals. Secondly, behaviors acquired through external forces refer to an individual's social environment. Bandura's (2006) article indicated that external factors dictate individual boundaries and how a person reacts to socio-structural environments.

Bandura's (1997) triadic reciprocal causation emphasizes how internal personal factors, behavior, and external environmental factors interact as determinants of observed behavior. Internal personal factors include cognitive, affective, and biological events, with agents relying on self-regulation through reflective thought, general knowledge, and personal skills to guide actions. Individuals exercise influence by anticipating and evaluating potential outcomes of their actions. Behaviorally, those with more excellent agency or acting options can better regulate their motivation and behavior, giving them greater freedom to achieve desired outcomes. Regarding environmental influence, cognitive processes shape self-influence mechanisms, guiding individuals toward particular courses of action. People establish personal standards that motivate and regulate their behaviors, demonstrating the interconnected nature of these determinants in shaping behavior.

Bandura's (1995) conception of individual agents is treated as cofactors. Bandura's (1995) concept of self explains that individuals partially contribute to what they become and do by exercising self-influence. That is, people work together to produce the result they desire. Beliefs are central to human performance. Merely possessing the necessary knowledge and skills for a task is insufficient; individuals must also believe they can execute the required behavior, even in challenging situations.

Effective functioning hinges on skills and the belief in one's ability to use them effectively, which develop concurrently as individuals mature and gain experience. Furthermore, these elements reciprocally interact with each other, as described by Bandura's (1995) concept of reciprocal causation, where the performance of one component is influenced, at least in part, by the performance of the other.

### **Social Cognitive Theory in Existing Literature and Research**

Self-efficacy is correlated to self-care behaviors, consistent with Bandura's (1995) proposition in the social cognitive theory (Tan et al., 2021). The study by Shen et al. (2020) demonstrated the application of social cognitive theory, showing that individuals with lower literacy levels were prone to misinterpreting information on drug labels and exhibited reduced engagement in drug decision-making. Additionally, these individuals were less inclined to communicate drug-related information with their healthcare providers actively. Individuals with low self-efficacy were less inclined to adopt new health behaviors or engage in self-care practices, leading to poorer self-care outcomes (Peyman et al., 2020). On the contrary, individuals with higher self-efficacy also demonstrated increased confidence, adhering to prescribed regimens, and a higher likelihood of sticking to medication regimens (Shen et al., 2020). Higher self-efficacy is crucial for engaging in successful self-care, and individuals with both high self-efficacy and health literacy showed an increase in motivation for self-care activities, highlighting the significance of these factors in promoting successful self-care behaviors (Darvishpour et al., 2022).

In addition to studies by Tan et al. (2021), Darvishpour et al. (2022), and Peyman et al. (2020) focused on self-efficacy, Shen et al. (2020) conducted a study on hypertensive patients, and their findings revealed that more than 50% of the participants displayed low adherence to their prescribed medication regimens. This is consistent with Bandura's (1995) suggestion that self-efficacy influences behavior by influencing individuals' motivation for behavioral change. Yuan et al. (2021) also found similar studies on Bandura's (1995) self-efficacy and self-care behaviors in adults with chronic diseases. They discovered that self-efficacy was a significant variable that affects the quality of life in community-dwelling elderly individuals with chronic diseases. Self-efficacy influenced the effect of other variables that correlated to the quality of life, such as those with better family functioning, which showed a strong positive correlation.

Shen et al. (2020) explained that self-efficacy is an important mediating factor between medication literacy and medication adherence. Other factors include education level, annual income, number of antihypertensive drugs prescribed, and number of times antihypertensive drugs are taken daily as influencing factors for adherence to medication regimens. Lee and Oh (2020) found that higher self-efficacy is linked to positive emotions and optimism, explaining the positive impact on the mental component of health-related quality of life, especially in older individuals. Increased self-efficacy in older adults contributes to greater confidence in managing chronic disease symptoms, long-term adherence, and improved coping skills, ultimately enhancing the health-related quality of life.

### **Social Cognitive Theory Rationale for Choice of Theory**

The social cognitive theory was chosen for this study because it incorporates crucial concepts that extensively elaborate on self-efficacy, especially its role in healthcare behavior. This study integrated self-efficacy concepts into healthcare for older adults, potentially improving their perception of health-related quality of life. Older individuals who take responsibility for self-care and believe in their caregiving skills tend to experience better mental quality of life. The theory relates to the question central to the present study, which revolves around the following risk factors affecting self-efficacy: age, sex, race, education level, complexity of medication, discussions on drug interactions, number of prescriptions, and overall physical and mental health. This theory builds on the risk factors of education level and medication literacy, noting that patients with higher medication literacy are more inclined to make accurate medication decisions.

Conversely, insufficient medication literacy leads to misunderstandings of medication information or negative attitudes toward antihypertensive drugs, resulting in poor adherence (Shen et al., 2020). Tan et al. (2021) found that self-care performance was low in older adults because individuals lacked the motivation to change their lifestyles. The level of education in the research question expands upon findings from Shen et al. (2020), which suggest a link between increased education, higher annual income, and elevated levels of medication literacy and adherence. The authors speculated that higher education and revenue patients might have greater access to medication knowledge and a better understanding of antihypertensive drugs, essential for forming positive attitudes and behaviors toward taking medications (Shen et al., 2020)

Barriers to self-efficacy in patients with chronic disease include health literacy, access, and support (Farley, 2019). Shen et al. (2020) recommended that health services offer easily understandable health education materials and explored using social cognitive and behavioral therapies in psychological treatments to enhance patient's self-efficacy. Shen et al. (2020) reported positive outcomes of interventions targeting and implementing self-efficacy to enhance medication adherence and literacy. Moreover, implementation identified significant predictors of attitudes and behavior, highlighting their critical role in promoting patients' medication adherence. In addition, Cross et al. (2020) suggested a range of complex behavioral intervention methods for improving medication adherence, including skill-building (e.g., supervised groups), family and support group discussions, video conferencing, inpatient self-administration programs, adherence monitoring (with or without feedback), and contracting (verbal or non-verbal). The knowledge gained through the project significantly contributed to improving patient's self-efficacy.

Healthcare leaders are encouraged to implement an intervention to efficacy by promoting self-management of patients' diseases to identify poor health-promoting behavior and promote regimen adherence; interventions include mobile phone applications, self-management, surveys addressing self-efficacy, and health literacy surveys in healthcare settings (Farley, 2019). Whitehall et al. (2021) discovered that older adults with higher general self-efficacy exhibit proactive health-promoting behaviors, such as seeking information, engaging in self-care, making health modifications, and adhering to treatment regimens. In contrast, those with lower general self-efficacy tend to

limit their involvement in daily activities and reduce efforts in specific tasks. Lastly, medication literacy was found to be correlated with self-efficacy as an independent predictor of medication adherence after controlling for sociodemographic and clinical information (Shen et al., 2020).

## **Conceptual Framework**

### **The Health Belief Model**

Social psychologists Rosenstock and others developed the health belief model in the U.S. Public Health Service in the 1950s (Rosenstock, 1974). The health belief model is a psychological theory that explains and predicts individual health behaviors based on personal beliefs. The health belief model explains, predicts, and understands individual behaviors, including whether individuals are likely to engage in risk-reducing behavior to prevent polypharmacy and adverse drug-drug interactions, thus demonstrating its phenomenon.

### **Seminal Researchers on the Health Belief Model Concept**

The health belief model identified vital factors affecting behaviors and barriers to perceived threat. Moreover, it offers insights into how these factors influence their operations (Gharouni et al., 2020). For example, if an individual is to change their behavior, they must first be susceptible to self-medication (perceived susceptibility) and understand the depth of related adverse effects on their life (perceived severity; Gharouni et al., 2020). Subsequently, the individual must admit the benefits of behavioral changes and stop using medications (perceived benefits). Likewise, they should overcome existing barriers by taking action (perceived barriers). Older adults can use medication wisely by

creating a joint action plan toward behavioral objectives (Gharouni et al., 2020). To accomplish this, health professionals are trained to apply the health belief model in comprehensive health centers and nursing care centers so that adherence to treatment and proper drug use improves health behaviors (Gharouni et al., 2020). Daily consumption of several medications results in the consequences of a well-known risk factor for polypharmacy and increases the risk of adverse reactions to medications. An individual's attitudes and beliefs could help to explain individual health behaviors, depending on the person's values placed on goals and the actions to achieve those goals. Self-medication is an essential part of a patient's medical behavior. This is usually the first choice to treat early disease symptoms because the risk associated with misusing medication can do more harm than good.

### **The Health Belief Model in Previous Studies**

In previous studies, the health belief model has been used to motivate individuals to choose positive health behaviors by increasing their awareness of side effects and decreasing the occurrence and severity of health complications. This model outlines several key components influencing health-related decision-making: perceived susceptibility and severity (individual assessment of risk and seriousness of a condition), perceived benefits (positive outcomes of a health behavior), perceived barriers (obstacles to adopting a behavior), cues to action (triggers for initiating behavior change), and self-efficacy (confidence in one's ability to take action). Widely applied in health behavior research, the health belief model helps understand how personal beliefs affect health

behavior, guides health education and promotion strategies, and informs the design of public health interventions.

Shen et al. (2020) defined medication literacy as health literacy in the context of medication use. Thus far, the concepts utilized in this model seem to be an ideal fit for the explanatory framework in healthcare and have proven valid. Below are research-based analyses that have been applied to previous studies, using similar concepts and variables to explain the use of the health belief model in older adults, with their intent to receive health examinations, understand the impact of over-the-counter medications, and behaviors that lead to adverse drug reactions in the case of intervention methods currently being examined.

Gharouni et al. (2020) found that the health belief model is considered a comprehensive and effective program that helps achieve this goal. The aging population would benefit from a broader integrative model of the health belief model. Rejeski and Fanning (2019) argued that integrating the health belief model determines the conscious processes that involve intentional motives and beliefs that traditional models and other theories may not encompass, discounting adequate attention to a multilevel level of health behaviors. Z. Zhang et al. (2021) examined factors influencing behavioral intentions for health examinations in rural Chinese individuals aged 60 and over using a structured questionnaire based on the health belief model's eight dimensions: perceived susceptibility, perceived severity, perceived benefits, perceived barriers, perceived self-efficacy, cues to action, and health knowledge and social support. Results revealed that health knowledge is pivotal in promoting attitude change preceding behavioral

modifications. Additionally, social support significantly impacts the physical and mental health status of older adults.

### **The Health Belief Model and Sociodemographic Factors**

This research identified sociographic factors that contribute to the understanding of the study's independent and dependent variables, in which a similar analysis of age, sex, educational level as well as knowledge of one's health relates to better health management, such as avoiding adverse drug effects when risk factors are identified. The health belief model explains the motivation of change, integrating personal beliefs and values to promote medication management in one's confidence in avoiding drug interactions.

### **Literature Review Related to Key Variables and Concepts**

Researcher McMaughan et al. (2020) identified a significant correlation between socioeconomic status (SES), encompassing education, employment status relative to older adults, and the inclination of patients to participate in their care actively, emphasizing the crucial role of adequate and accessible healthcare access in promoting healthy aging, particularly noting that older adults in the United States are considerably more prone to receiving clinical preventive services when they have regular healthcare sources. A similar study by Schladitz et al. (2022) asserted that men and women exhibit distinct aging patterns, with both genders valuing social contacts in old age. However, women may find it more accessible. Participants emphasized different motivations for exercise, with older men focusing on performance and disease prevention and older women aiming to maintain mental and physical well-being. Although overall satisfaction

with healthcare was high, there was a desire for more preventive services. Men expressed a need for gender-specific considerations in medication prescriptions and dosages, prompting Schladitz et al. to recommend gender-specific considerations in drug approvals and related studies.

Indeed, most patients are reluctant to ask questions because healthcare managers are considered authority figures (Sarkhosh et al., 2022). In a similar study, Norberg et al. (2023) found that the majority of older individuals experienced care transition as complex and challenging, expressed confusion about the medication information as well as hesitated to question hospital staff about their medications during admission, and trusted the physician and accepted their decisions without questioning during the transferred between hospital and municipal health care settings; respondents also expressed that they hesitated them. Evidence showed that patients could improve safety and prevent errors and adverse events (Sarkhosh et al., 2022). In addition, due to the lack of relevant knowledge and limited access to information, X.Wang et al. (2023) found that older adults were limited in identifying suspected adverse drug reactions.

Similarly, Gharouni et al.'s (2020) study used the health belief model. They found that participants who perceived susceptibility and barriers negatively correlated with lifestyle, whereas perceived benefits, general health motivation, and self-efficacy showed a positive correlation. The study suggested that SES might worsen cognitive impairment inequality among older adults, as higher SES individuals tend to have more resources for diagnosis and mitigating cognitive decline. Researchers Assari and Bazargan (2019) found that socioeconomic position (SEP), not race/ethnicity, impacts polypharmacy and

that the effects of socioeconomic position indicators depend on race/ethnicity. The authors went on to discuss that low income has a more substantial effect as a risk factor for polypharmacy among African American older adults than among white older adults in the United States (Assari & Bazargan, 2019). X.Wang et al. (2023) found that non-Hispanic Whites were more likely to have access to new medications than non-Hispanic Blacks and that Hispanic Whites had similar results, showing that polypharmacy reached the highest level among non-Hispanic Whites.

J. Zhang et al. (2022) noted that positive beliefs, encompassing perceived benefits, general health motivation, and self-efficacy, directly and positively impact lifestyle, contributing to successful cognitive aging. Equally important is considering the critical role of communication between patients and healthcare providers in reducing preventable adverse events, particularly among older adults, highlighting the significance of open lines of communication to influence attitudes and behaviors effectively (Chippa & Roy, 2023). Zhang et al.(2021) revealed that in elderly patients with Type 2 diabetes, health beliefs positively influenced self-efficacy, contributing to enhanced HbA1c control, and highlighted the health belief model's self-efficacy construct as a partial mediator; this understanding can be extended to assessing patient perceptions of safety in healthcare organizations through the health belief model construct.

### **The Issue of Polypharmacy and Adverse Events**

Yadesa et al. (2021) argued that adverse reactions manifest in any patient. However, certain risk factors have been commonly identified in older adults. Nonetheless, older adults experience more significant morbidity and often take multiple

medications, making them susceptible to increased risk of adverse drug reactions (Cahir et al., 2023). This heightens the risk of adverse drug reactions and has been attributed to age-related changes in pharmacodynamics and pharmacokinetics, resulting in prolonged elimination of half-life of medications and increase in sensitivity to drugs in this population (Woo et al., 2020). Yadesa et al.'s (2021) study revealed that most adverse drug reactions found in older adults are predictable and preventable in 60% of the cases studied. Furthermore, 40% of hospitalizations-related falls are due to polypharmacy and medication-related falls that could have been potentially prevented (Zaninotto et al., 2020).

### **Adverse Drug Effects During Transition of Care**

Christopher et al. (2022) conducted a study on medication issues among older adults, highlighting the main common concerns surrounding medication use at the primary care level: (a) prescribing, (b) communicating orders, (c) dispensing/administering, and (d) monitoring medications. These were further categorized into domains such as inappropriate polypharmacy, nonadherence, suboptimal monitoring, poor home medication management, under-prescribing, and inadequate communication. This study contributes to this paper's purpose by identifying the risk factors that correlate with older adults' risk and motivation in avoiding drug interactions. Additionally, it provides recommendations (e.g., counseling and communication) at the primary care level to address beliefs surrounding medication adherence and emphasizes the need for more geriatric care and specializations. Furthermore, the study highlighted the significance of knowledge and communication with healthcare providers in enhancing

older adults' understanding and adaptation to medication side effects. Poor communication has been commonly seen between transitions of care (Ruscin & Linnebur, 2021). Poor communication regarding medication management poses barriers to effective transitional care, elevating the risk of hospital readmissions (Prasad et al., 2024). Christopher et al. (2022) emphasized that, alongside effective communication, offering information and counseling to older adults about their perspectives on medication can mitigate misunderstandings, boost confidence in medication usage, and enhance overall outcomes.

Caleres et al. (2020) emphasized the importance of accurate discharge summaries and medication lists, and patients often lack this information, leading to potential issues with drug quality and medication-related changes. Their study suggests that pharmacist involvement in discharge interventions, particularly in medication information preparation, has been shown to improve accurate discharge medication information. In addition, prescribing a drug for one condition may exacerbate another, particularly concerning for older adults due to heightened risks of adverse drug-drug interactions (Ruscin & Linnebur, 2021). The term "prescribing cascades," as highlighted by Farrell et al. (2020), involves treating the side effects of a medication with a second drug that is often mistaken as a new medical condition, leading to potentially unnecessary prescriptions. Prescribing cascade becomes intricate and problematic, contributing to inappropriate polypharmacy, especially in older adults with chronic conditions and geriatric syndromes (Sternberg et al., 2021). To prevent prescribing cascades, it is essential to identify and address adverse drug reactions promptly. Actions such as dose

reduction, discontinuation of the causing medication, or transitioning to alternative pharmacotherapies have been suggested (Adrien et al., 2023).

### **Over the Counter Medication Concerns**

Nonetheless, complementary and alternative medicine, including herbal and dietary supplements like ginkgo biloba or St. John's Wort use, is increasing among older adults, and many patients do not communicate this with their primary care practitioners (Golden et al., 2023). Fravel et al. (2023) discovered that dietary supplements and alternative medications can play a role in drug interactions and contribute to polypharmacy. These findings are crucial for understanding the correlation with the study's independent variable in the research question. Tangkiatkumjai et al. (2020) noted that providers should be prepared to offer information on alternative medicine to prevent inappropriate alternative medication use. Thus, dedicate more time to clearly explain treatment options, expected outcomes, and potential adverse effects, including herbal-drug interactions.

### **Drug Metabolism in Older Adults**

In a recent 2023 study by Konstandi and Johnson, they found that drug-drug interactions in older adults differ from the general population, with 50% of drugs being prescribed without adherence to age-related guidelines. The study emphasized the significance of the cytochrome P450 (CYP) system in drug metabolism as a crucial factor in the occurrence of interactions, leading to potential drug toxicities, diminished pharmacological effects, and adverse reactions. Thus, the induction of cytochrome P-450 (CYP450) drug metabolism by certain drugs may be decreased in older adults;

therefore, the change (increase) in drug metabolism may be less pronounced in older adults (Ruscin & Linnebur, 2021).

The higher occurrence of adverse drug reactions in older adults is associated with age-related factors, along with the widespread practice of prescribing multiple medications for concurrent health conditions (Bellanca et al., 2023). Susa et al. (2023) emphasize the significance of the interprofessional healthcare team in monitoring signs of metabolite buildup when prescribing medications. Studies have shown that the risk of adverse reactions increases substantially with the number of medications, reaching 13% for individuals on two medications, 58% for those on five, and 82% for those on seven or more per day (Bellanca et al., 2023). The healthcare team could consider variations in drug effects attributed to drug-metabolism enzymes, which result in diverse patient reactions to various drugs prescribed.

### **Lack of Patient Adherence and Complicated Drug Regimens**

Drug effectiveness is often compromised by a lack of patient adherence among ambulatory older adults (Ruscin & Linnebur, 2021). In studies addressing concerns about adverse drug effects and polypharmacy in older adults, Yoon et al. (2023) identified healthcare team and system-related issues. They found a lack of communication skills among healthcare professionals, leading to prolonged wait times for prescription refills. This deficiency in communication contributes to inadequate patient-clinician relationships, exacerbating overall system-related issues in healthcare.

Liu et al. (2023) delved deeper into nonadherence in older adults, revealing associations with factors such as age, sex, cognitive impairment, stroke, consistent

physician visits, self-administration of medication, drug costs comprising  $\geq 10\%$  of medical expenses, and potentially inappropriate medication for the alimentary tract and metabolism that affect medication adherence. In the study, female patients exhibited nonadherence, potentially influenced by their significant role in caring for other household members, leading them to neglect self-care, including medication adherence.

Furthermore, language barriers also potentially threaten medication safety and overall patient well-being. Language barriers were identified as the primary obstacle in Lynnerup et al.'s (2022) study, along with cultural differences and lack of trust that hinders healthcare access for migrant patients in both general practitioner and hospital settings. Ruscin and Linnebur (2021) discovered that up to 50% of older adults deviate from prescribed medication instructions, often taking less than recommended.

Additionally, complex regimens that involve frequent or infrequent dosing and multiple drugs may contribute to difficulties in adherence for patients. Healthcare professionals, including geriatric and homecare staff, nurses, and pharmacy staff, noted that language barriers create distance from patients and result in missed health improvement opportunities, which lead to a lack of information shared about medications, particularly at the pharmacy counter (Lynnerup et al., 2022).

### **Lack of Health Literacy Assessment and the Role of Healthcare Providers**

Gentizon et al. (2022) stressed integrating cognitive and social skills in managing medication regimens. The study underscored the impact of medication regimens and healthcare service organizations on medication literacy, urging healthcare professionals to consider these factors. Even more, Ruscin and Linnebur (2021) investigated health

literacy and adherence, addressing patient limitations by recommending accessible containers, large-type labels, and instructions. They suggested using containers with reminder alarms, filling containers based on daily needs, or providing medication assistance. Other aids such as medication lists, reminders, and educating caregiver practices responsible for medication preparation and administration are practical tools for achieving optimal medication literacy (Gentizon et al., 2022).

Pharmacists can employ diverse strategies to tailor patient education for those with low health literacy (Chan et al., 2020). Effective communication techniques and counseling strategies could be used to support patients with inadequate health literacy (Chan et al., 2020). An approach to mitigating polypharmacy involves pharmacist-led comprehensive medication reviews to discuss adverse drug effects, encourage medication simplification, identify changes in functional status, assist patients with deprescribing, and provide appropriate patient education (Shaikh, 2024).

Ibrahim et al. (2021) highlighted the effectiveness of pharmacist-led interventions in reducing unnecessary medications. Studies by Lunghi et al. (2022) support pharmacists' involvement in the medication review process for patients and prescribers.

The high-risk population, which encompasses factors such as sex, race, ethnicity, and education, has been a focal point in the literature findings and studies examining the social patterning of polypharmacy in older adults. However, there is a scarcity of research on the subject matter. Rochon et al. (2021) noted a knowledge deficit, demonstrating that older women are most susceptible to polypharmacy, primarily due to alterations in pharmacokinetics and pharmacodynamics. Fravel et al.'s (2023) study delves deeper into

the dynamics of polypharmacy, unveiling a noteworthy increase in the use of supplements and alternative medicines. Interestingly, this surge is more pronounced among specific subgroups, including women, individuals with higher education, those already experiencing polypharmacy (taking multiple prescription medications), and frail women. These findings underscored the complex interplay of various demographic and health-related factors in shaping patterns of polypharmacy among older adults. Thapaliya et al.'s (2021) study discovered that women with two or more chronic diseases, as well as those without medication reviews, experienced a higher incidence of polypharmacy compared to women utilizing medication review services.

Studies have looked at providing educational programs for nurses, resident physicians, and pharmacy personnel as a solution. Ibrahim et al.'s study supports the efficacy of pharmacist-led programs, and in conjunction, Ravi et al. (2022) advocate for nurse-pharmacist collaboration as a complementary strategy to address community medication safety gaps, streamline healthcare assessments, and enhance collaborative practices. This approach has demonstrated benefits such as improved disease management, prevention of adverse drug effects, reduced hospitalizations, decreased wait times, and enhanced chronic disease self-management skills for community-dwelling adults.

Overall, there is considerable research that has highlighted the importance of studies on polypharmacy in older adults and the associated risk of negative adverse drug effects. Table 1 outlines the criteria for avoiding drug interactions. A systematic search strategy applied to well-defined and precise research is discussed for a deeper

understanding of motivating health behavior and adverse drug effects in older adults, along with the literature review of the self-efficacy theory and the health belief model on Previous Relevant Studies.

**Table 1**

*Criteria for Avoiding Drug Interactions*

Category	Definition
Drug interactions	The use of drugs results in a drug-drug, drug-food, drug supplement, or drug-disease interaction, leading to adverse effects or decreased efficacy.
Inadequate monitoring	A medical problem is treated with the correct drug, but the patient is not adequately monitored for complications, effectiveness, or both.
Inappropriate treatment	A patient is taking a drug for no medically valid reason, or the treatment risks outweigh the drug's potential benefits.
Lack of patient adherence	The correct drug for a medical problem is prescribed, but the patient is not taking it as directed.
Overdosage	A medical problem is being treated with too much of the correct drug.
Poor communication	Drugs are inappropriately dosed, duplicated, or stopped when care is poorly transitioned between providers or facilities.
Underprescribing	A medical problem is being treated with too little of the correct drug.
Untreated medical problem	A medical problem requires drug therapy, but no drug is being used to treat that problem.

**Communicating OTC Discussing Adverse Drug Reactions**

Adults aged 65 years or older (older adults) use a disproportionately large number of OTC medications compared to other age groups (Shah et al., 2020). These elevated patterns of OTC medication use do not necessarily translate into older adults having a

greater understanding of these medications or their safety profiles (Shah et al., 2020). The potential for not following label instructions is exacerbated when a person lacks knowledge about the instructions for medication use, including the warning messages accompanying those instructions.

Older adults' perceptions of the safety of their selected OTC medication were assessed by exploring their knowledge and beliefs about OTC-induced health problems and interactions with their current health conditions and the other medications they take. Older adults expressed different degrees of confidence about the safety of the OTC medication that they selected (Shah et al., 2020). Since deficits in patient knowledge about their OTC medications may lead to adverse outcomes, a promising finding was that patients' most common formal source of information when they had questions about their selected medications was pharmacists.

Balderson et al.(2023) contended that while prescribers should review all medications with older adults carefully, adherence to this practice is not consistently observed. This discrepancy can be attributed to various factors, such as limited awareness among healthcare providers and patients regarding the link between medications and falls, patients' strong convictions about the necessity of their medications, and providers' reluctance to modify prescriptions, even when prompted by patients to discuss potential changes. According to Martin et al. (2022), older adults should consult a doctor or pharmacist before buying and using OTC medications. Respondents in their study emphasized the importance of seeking professional advice when choosing OTC medications due to the potential for adverse drug reactions (ADRs), interactions with

other medications, and the risk of improper dosing. The study highlights the need for ongoing education to ensure older adults understand the importance of consulting healthcare professionals for proper guidance on selecting and using OTC medications. Additionally, the researchers have suggested that older consumers often neglect crucial information on OTC labels, particularly the Drug Facts Label (DFL).

Rodziewicz et al. (2023) identified several concerns in hospitals and other healthcare settings, including adverse events and unintentional injuries or complications resulting in prolonged hospital stays, and unintentional harm in these settings could have been prevented. Inappropriate prescription and over-the-counter medication use in older adults are commonly associated with adverse drug effects, injuries leading to hospitalizations, and reduced quality of life (Beck et al., 2022). Stone et al. (2020) reported in their study that participants who had knowledge about unsafe OTC medications and taking multiple medications were aware that it is unsafe to take additional OTC medications without talking to the doctor. This study revealed that previous research concerning the decision-making process for OTC medications has predominantly examined individual-level factors impacting older adults' views on OTC safety. These factors, such as literacy, demographics, attitudes, beliefs, confidence, knowledge, and age, play a significant role in the selection and utilization of OTC. Finally, specific physiological, psychological, behavioral, and social factors can impact cognitive aging, and adjusting to these elements can help prevent or postpone cognitive decline and mitigate the risk of dementia (Gharouni et al., 2020).

### **Aging, Beliefs and the Physical and Mental Health of Older Adults**

A recent study by Xu et al. (2021) identified risk factors positively associated with prescribing medications potentially inappropriate for older adults. Term searches in this literature examined multiple factors, including age, number of medications, inadequate knowledge, lack of communication/integrated care, limited understanding, concerns about adverse drug reactions, time constraints, potentially inappropriate prescriptions, polypharmacy, sociodemographic factors, low SES, low income, low education level, illiteracy, and gender. Studies have also found polypharmacy as a rise in the prevalence of drug-related problems in older patients. Polypharmacy leads to cognitive impairment, impaired balance, risk of falls, and hospitalizations (Chippa & Roy, 2023).

Świątoniowska-Lonc et al. (2021) looked at a common belief: older persons are non-adherent to medication regimens. This study found that patients believe that medication helps them, while some believe that multiple harmful effects of the treatment may outweigh any positive outcomes. Their attitude toward the treatment and their convictions and fears may significantly influence their adherence to the established therapeutic protocol. Older people may have developed beliefs and views about the drugs they use, often based on their own or their family's previous experience.

Despite the surface acceptance of managing polypharmacy, conflicting positive and negative perspectives underscore ambivalent beliefs: acknowledging medication's utility in promoting better health yet simultaneously harboring concerns regarding potential drug interactions, side effects, and overuse. Cognitive impairment is postulated

as the most significant contributor to poor medication management with an increased risk of hospital admission (Mills & MacLure, 2021). A comprehensive tool for assessing geriatric conditions contributes to reducing inappropriate prescribing/polypharmacy during hospitalization (Mills & MacLure, 2021).

### **Summary and Conclusions**

This chapter summarizes the drug-drug interactions in older adults, polypharmacy issues, and factors that impact older adults' physical and mental health. What is known is that self-efficacy and the health belief model have proven valid and reliable in predicting health behaviors. These theoretical perspectives are meant to provide healthcare providers with a construct that helps them identify risks of adverse drug effects, understand motivating health beliefs, and promote healthy functioning in this population. What is not known in this study is that while self-medication is why individuals choose to treat symptoms of illness or condition, some people are not always aware of the adverse drug effects. Since many factors determine the risk for adverse drug effects, medications must be used with caution.

Intervention methods to address gaps in the literature include enhancing communication between patients and clinicians and applying the health belief model, which encompasses the concept of social cognitive theory's self-efficacy. These approaches were identified as significant factors in boosting confidence and encouraging patient behaviors, fostering favorable health outcomes among older adults. Identifying factors such as age, gender, education level, health literacy, residency, income, health beliefs, and social support are a few considerations for predicting health behaviors. This

paper also discussed the view of ageism and how medication and dosing methods are similarly prescribed among older and younger adults.

All in all, healthcare professionals play a significant role in reducing ageism, promoting healthcare access, and appropriately managing geriatric care. A combined lack of coordinated care can also pose a higher risk of drug toxicity due to decreased metabolism in older adults. Despite disseminating knowledge, many studies have documented a high prevalence of inappropriate prescribing. In most cases, improper drug administration could be avoided.

Chapter 3 describes the research design used to study the confidence in avoiding drug interactions in older adults 65 and over. Also presented are descriptions of sampling procedures, eligibility criteria, instrumentation, data analysis, and protection of human participants.

## Chapter 3: Research Method

### **Introduction**

In this quantitative archival study, I examined the potential impact of the independent variables of age, sex, race, education level, complexity of medication, drug interaction discussions, number of prescriptions, and overall physical and mental health on the dependent variable of avoiding drug interactions in older adults, 65 and over. There is little research addressing risk factors for polypharmacy and adverse drug effects on older adults. Due to this gap, there is a need for further study to identify risk factors associated with older adults' knowledge and confidence in adverse drug reactions.

This chapter presents the research method and design. The first section includes the research design and rationale that explains the reasoning for using quantitative secondary analysis in connection to the research question. The methodology section details the sampling and sampling procedures, including the sampling frame and size, and I describe the archival dataset. In the instrumentation section, I operationalize the dependent and independent variables. I then detail the data analysis plan to answer my research questions and discuss threats to construct and statistical conclusion validity. Finally, I discuss the ethical issues related to my secondary analysis and how the data were initially obtained. A summary concludes this chapter.

### **Research Design and Rationale**

I employed a quantitative study using a synthesis of archival secondary data to examine the extent to which demographics, health-related, and prescription-related variables account for variance in confidence in avoiding drug interactions in older adults.

The research question was analyzed using a multiple linear regression model that modeled the overall proportion of variance for the dependent variable and the relative importance of each predictor. Resource constraints with the archival design include not having control of the data collection, the set of measured variables, or the operationalization of the variables. Findings from this study may advance knowledge in the discipline by providing a tertiary prevention model of risk and protective factors for prescription drug interactions in older adults, which may inform polypharmacy intervention efforts and help clinicians respond to the needs of a diverse population.

### **Methodology**

I used publicly available data from the ICPSR from the United States National Poll on Healthy Aging (NPHA; Malani et al., 2017).

### **Population and Sample Size**

In 2019, in the United States, about 53 million noninstitutionalized adults aged 65 or older (U.S. Bureau of Labor Statistics, 2020). Malani et al.'s (2017) NPHA data included 1,065 noninstitutionalized respondents aged 65 or older, constituting the initial sample size before data cleaning for my secondary analysis.

### **Sampling Procedures**

Malani et al. (2017) documented that NPHA participants were recruited using a probability-based web panel representative of noninstitutionalized adults in the United States. Eligible web panel members were sent a link to an online survey. Respondents had the convenience of choosing what time of the day to complete the study. On April 1, 2017, 1,333 individuals aged 65 or older were sent the invitation to participate with email

reminders to nonrespondents on days 3, 7, and 14. Data collection ended on April 16, 2017, with 1,065 individuals completing the survey for an 80% response rate. The median length of time to complete the survey was 8 minutes.

The average age of those aged 65 or older was 70.9 ( $SD = 4.2$ ,  $Mdn = 70$ ). About one-third had a bachelor's degree or higher, another one-third had some college, and for 27.7%, the highest education was high school. The majority (79.4%) were White. Males (48.5%) and females (51.5%) were nearly equally represented. Two-thirds were married, and the majority (85.5%) owned their home. The majority (72.6%) were retired. Annual household income ranged from less than \$5,000 to \$250,000; 30.3% had less than \$40,000, 34.5% between \$40,000 and \$84,999, and 35.2% had \$85,000 or more.

### **Archival Data Access and Power Analysis**

The data of Malani et al. (2017) underwent a confidentiality review by ICPSR and was made publicly available on May 29, 2019. Access is not restricted and does not require affiliation with an ICPSR member institution. Documentation and data can be downloaded from <https://www.icpsr.umich.edu/web/ICPSR/studies/37305>.

Power analysis is not about determining the sample size for archival data with a preset number of cases. Instead, given sample size, what is the minimally statistically significant effect size at  $\alpha = .05$ . If 500 of the 1,065 have valid data across the list of 10 key study variables, then in a multiple linear regression with nine predictors in which the overall multiple- $R^2 = .0196$  (a small overall effect [Cohen, 1988]) an individual predictor effect of squared semi-partial correlation = .0076 (i.e., Cohen's  $f^2 = .0077$ ), a minimal effect, was statistically significant (see Appendix A). Because of this, individual

predictors' effect sizes were prioritized when interpreting a statistically significant result to ensure practical importance.

### **Instrumentation and Operationalization of Constructs**

Malani et al.'s (2017) archival ICPSR data were used for my secondary analysis study. For my study, I selected to analyze 10 variables, each composed of a single survey item, with the following categorical or metric response levels: age (2), sex (2), race (5), education (4), complexity of medication management (3), drug interactions discussions in the past 2 years (3), the number of prescriptions currently taking (5), physical health rating (5), mental health rating (5), and confidence in avoiding drug interactions (4). Participant variables were selected from the review of the literature based on what was known in the discipline of drug interactions in older adults (see Table 2).

**Table 2***Archival Variables Selected for Secondary Analysis*

Variable name	Values of variables
Age	50 to 64 years old, 65 to 80 years old
Sex	Male, Female
Race	White, Non-Hispanic; Black, Non-White; Other, Non-Hispanic; Hispanic; 2+ Races; Non-Hispanic
Education	Less than high school, High school, Some college, Bachelor's degree or higher
Complexity of medication management	Low, Medium, High
Drug interaction discussions in the past 2 years	Yes, No, Don't know
Number of prescriptions currently taking	0, 1, 2-3, 4-5, 6 or More
Physical health rating	Excellent, Very good, Good, Fair, Poor
Mental health rating	Excellent, Very good, Good, Fair, Poor
Confidence in avoiding drug interactions	Very confident, Mostly confident, Somewhat confident, Not confident

**Data Analysis Plan**

SPSS, a statistical analysis software application that supports the use of multiple linear regression, was used to examine the descriptive analysis among the following variables: participants' age, sex, race, education level, the complexity of medication, drug interactions discussions, number of prescriptions, and overall physical and mental health, predicting for the dependent variable: confidence in avoiding drug interactions.

**Research Question**

RQ: To what extent do age, sex, race, education level, the complexity of medication, drug interaction discussions, number of prescriptions, overall physical health,

and overall mental health account for variance in confidence in avoiding drug interactions?

*H<sub>0</sub>*: The predictors do not account for variance in confidence in avoiding drug interactions.

*H<sub>1</sub>*: The set of predictors does account for variance in confidence in avoiding drug interactions.

Avoiding drug interactions in older adults is the dependent variable. Age, sex, race, education level, the complexity of medication, drug interaction discussions, number of prescriptions, overall physical health, and overall mental health are the independent variables. Multiple linear regression was conducted to examine the predictors' overall and relative importance effects (i.e., squared semi-partial correlation).

Before conducting the multiple linear regression, the data was screened and cleaned for missing data. Only those cases with non-missing data across the key study variables were used. Multivariate outliers were examined following Tabachnick and Fidell's (2007) procedure of regressing a random variable on the set of independent variables and the dependent variable.

Tabachnick and Fidell's (2007) procedures were demonstrated in two 2020 studies found in González-Roz et al. (2020) and Ramadan et al. (2020) that utilized their data screening methods, multivariate analysis techniques, and assumption testing to ensure the accuracy and validity of results. These procedures have proven effective across various topics, as evidenced by their early application in behavioral and social sciences research.

Cases with Mahalanobis values that exceeded the critical chi-square value at  $\alpha = .001$  and were substantially discontinuous with the distribution of other cases were eliminated from further analysis. I ran a preliminary multiple linear regression to examine multicollinearity among predictors and normality, linearity, and homoscedasticity of regression residuals to identify threats to statistical conclusion validity.

### **Threats to Validity**

For nonexperimental studies, Walden University only requires a description of threats to construct and statistical conclusion validity. Constructs, per se, are not being measured. Instead, participants self-report demographics and other characteristics. Because of the data's self-report nature, the study's construct validity is threatened if participants were not truthful or accurate in their item responses, which could have affected the observed relationships between variables. The research question is about accounting for variance in a dependent variable by a set of independent variables. A multiple linear regression is the appropriate analysis, and the sample size is more than adequate to avoid Type II errors and to ensure statistical conclusion validity. However, the validity of the statistical conclusion is threatened by a misspecified regression model (Cohen, 1988), which is the absence of other variables that might account for variance in the dependent variable. Therefore, statistical conclusion validity is limited to the variables in the regression model and could have a different result if other variables were included, which could also affect the relative importance of a predictor given the other predictors in the model.

### **Ethical Procedures**

Data produced during human subject research were de-identified to preserve the privacy of research participants. Publicly available data from the ICPSR were easily accessible to the public.

No HIPAA or privacy act violations were probable. Panelists can visit their online member page to take a survey (i.e., instead of being contacted by telephone or postal mail). This approach reduced the burden placed on respondents because email notification is less intrusive than telephone calls. In addition, respondents can choose what time of the day to complete their assigned survey.

U.S. copyright law governs the making of photocopies or other reproduction of the copyrighted material. Terms and restrictions apply to copyrighted content. A specified condition of the material is that it be used for private study, scholarship, or research.

The NPHA data (Malani et al., 2017) used a preestablished independent web panel that operates an ongoing incentive program to encourage participation and create member loyalty. Their members can enter “special raffles” or “special sweepstakes” with cash rewards and other prizes for taking surveys. In the case of longer surveys, additional incentives were typically provided.

### **Summary**

In summary, Chapter 3 discussed the details and development of my quantitative-correlational secondary analysis. This chapter discussed the research methods and procedures employed to examine the potential effects of the following independent

variables: age, sex, race, education level, complexity of medication, drug interaction discussions, number of prescriptions, and overall physical and mental health on the dependent variable: avoiding drug interactions in older adults.

## Chapter 4: Results

### Introduction

The purpose of this study was to examine how various risk factors—age, sex, race, education level, medication complexity, drug interaction discussions, number of prescriptions, and overall physical and mental health—affect older adults' confidence in avoiding drug interactions. The research question explored to what extent these factors explain the variance in confidence levels. The hypotheses tested were: ( $H_0$ ) the set of predictors accounts for the variance in confidence in avoiding drug interactions, and ( $H_1$ ) the predictors do not account for the variance.

Chapter 4 is organized into several sections, including an introduction, details on data collection methods, a presentation of the results, and a summary. This chapter focuses on multiple linear regression analyses and descriptive statistics findings.

### Data Collection

This section presents an overview of the data collection process, recruitment methods, study sample characteristics, and procedures followed to ensure data integrity and validity. The study utilized secondary data from Malani et al. (2017). It involved a series of steps to clean and prepare the dataset for analysis, including addressing discrepancies and making necessary adjustments to variables. Additionally, baseline demographic and descriptive characteristics of the sample are outlined, followed by an assessment of the sample's representativeness about the target population. Finally, univariate analyses are discussed to justify the inclusion of relevant covariates in the

subsequent regression models. This comprehensive approach ensures that the study's findings are robust and externally valid.

### **Time Frame and Recruitment**

The study utilized secondary data from Malani et al. (2017), with 1,065 participants meeting inclusion and exclusion criteria before data cleaning. Malani et al.'s data collection began with a pre-test on March 14, 2017, and the primary survey was conducted between April 1-16, 2017. Table 3 displays the primary survey's data collection and the overall response rate, including the number of participants for each sample's age groups 50–64 and 65–80. Participants were recruited through a web panel that targeted individuals 65 years and older with senior health issues, with notifications sent via email or through their member pages. The original study reported an 80% response rate for respondents ages 65–80 years old.

**Table 3**

*Data Collection Timeline and Response Rate*

Main survey phase sample	No. sampled for main survey	No. who completed main survey	Response rate (%)
Ages 50–64	1,429	1,066	75
Ages 65–80	1,333	1,065	80
Total recruitment	2,762	2,131	77

*Note.* “Original” refers to Malani et al.'s study's design and documentation.

### **Discrepancies in Data Collection**

There were no significant discrepancies from the data collection plan outlined in Chapter 3. However, some adjustments were made during data preparation. Variables

were recoded, dummy variables were created for race, and multiple education level responses were collapsed into five categories. Additionally, outliers identified using Mahalanobis distance were removed from the sample, as described in Table 4, which lists discrepancies between the planned and actual data collection, along with the modifications made to the variables (e.g., recoding, collapsing categories).

**Table 4**

*Discrepancies and Adjustments in Data Collection*

Discrepancy/adjustment	Planned approach (Chapter 3)	Actual approach	Notes on changes made
Variable recoding	No changes	Recoding applied	Dummy variables for race
Collapsing education levels	Detailed categories	Collapsed to five	See Table 5 for details

**Baseline Descriptive and Demographic Characteristics**

The final sample size after data cleaning was 919 participants. Table 5 presents the baseline demographic characteristics, including age, sex, race, education level, and health ratings. Most respondents were White (80.5%), with a nearly even split between males and females. Around 52.8% had medium complexity in medication management, and two-thirds had not had recent discussions about drug interactions. Health ratings and confidence in avoiding drug interactions varied, with 9.6% reporting low confidence.

**Table 5***Descriptive and Demographic Characteristics of the Sample*

Variable	<i>N</i>	%
Age ( $M = 71.1$ , $SD = 4.2$ )		
Sex		
Male	451	49.4
Female	462	50.6
Race		
White, Non-Hispanic	735	80.5
Black, Non-Hispanic	69	7.6
Hispanic	55	6.0
Other, Non-Hispanic	54	5.9
Education Level		
Less than HS	64	7.0
HS or GED	257	28.1
Some College or Associates	293	32.1
Bachelors	156	17.1
Advanced (Masters or more)	143	15.7
Complexity of medication management		
Low	245	26.8
Medium	482	52.8
High	186	20.4
Health ratings (physical and mental)		
Good	551	60.3
Very good	686	79.6
Fair	190	20.8
Poor	23	2.5

**Sample Representativeness and External Validity**

The sample was reasonably representative of older adults, with efforts made to ensure diversity in race and education level. As described in Table 6, the sample's representativeness is provided. Non-probability sampling was used, and proportionality to the larger population was ensured through data cleaning and adjustments to the dataset

variables, making the findings externally valid for older adults taking multiple prescriptions.

**Table 6**

*Comparison of Sample Demographics With Population Characteristics*

Variable	Sample %	<i>n</i>	Notes on representativeness comparison reported
Sex: Male	49.4	451	Females are slightly higher (50.6%)
Race: White, Non-Hispanic	80.5	735	Highest confidence in avoiding drug interactions vs. other, non-Hispanic (5.9%) lowest race
Education: High school or less	35.1	321	Highest education level report vs. advanced degrees-masters (15.7%), lowest education level
Complexity of medication management	52.8	482	Medium complexity vs highest complexity (20.4%) lowest

**Data Preparation**

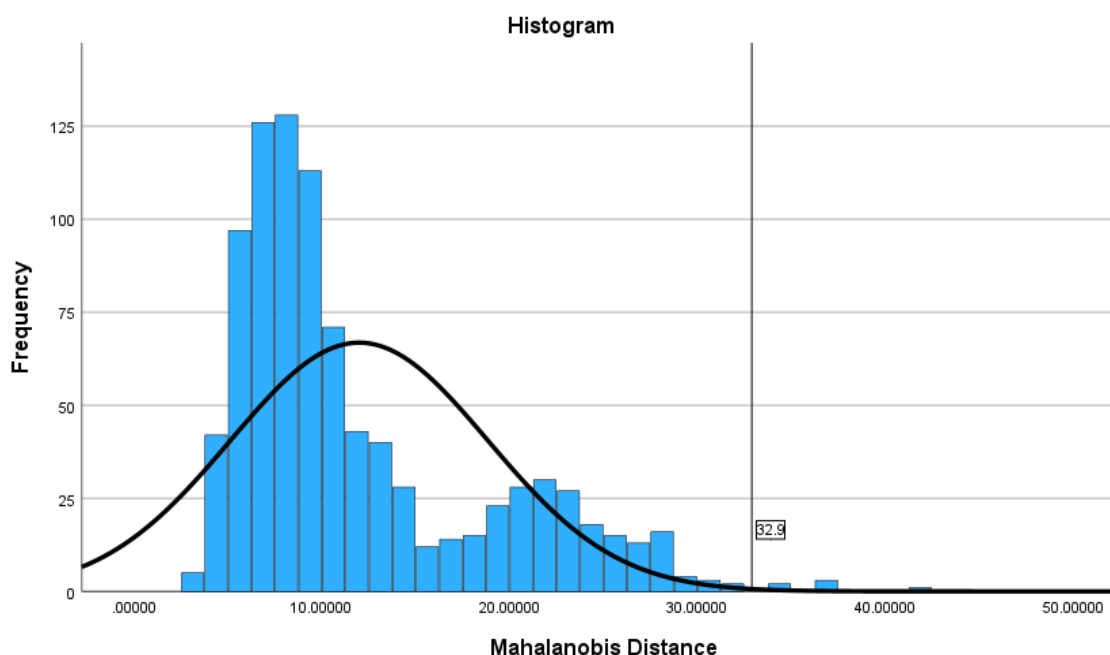
Data cleaning in Malani et al.'s (2017) dataset for secondary analysis is as follows: The analysis was limited to participants 65 years of age and older, resulting in a valid number of 1,065 participants. Participants currently taking at least one prescription medication were valid  $N = 936$ , and participants with non-missing data across the 10 study variables (valid  $N = 919$ ) and 10 variables of interest were included in my study. A screening for multivariate outliers was performed in this study. Following Tabachnick and Fidell (2007), the nine and three dummy variables for race were regressed on a random variable.

## Modifications to Variables

The maximum Mahalanobis value was 41.551. The critical value for the 12 predictors is 32.909. Six participants had Mahalanobis values exceeding 32.909, as shown in Figure 1, and were eliminated from further analysis as multivariate outliers. The valid  $N$  for data analysis after data preparation and cleaning measures was  $N = 913$ .

**Figure 1**

*Histogram of Mahalanobis Distance Depicting Multivariate Outliers*



## Univariate Analysis and Covariates

Fundamental univariate analyses justified the inclusion of covariates in the regression model. Table 7 describes the results of Univariate Analyses and Covariate Justification. This table presents the univariate analysis results (e.g., means, standard deviations, frequencies) for critical variables. Variables such as sex, race, and education

level were recoded to fit the model, and significant predictors of confidence in avoiding drug interactions were identified based on these analyses. The results ensured that the selected covariates were relevant for further statistical modeling.

**Table 7**

*Results of Univariate Analysis and Covariate Justification*

Variable	Mean ( <i>SD</i> ) or <i>N</i> (%)	<i>p</i> -value for covariate inclusion
Age	[71.1, 4.2]	.384
Sex (male/female)	[913]	.168
Race (White, Non-Hispanic)	[913]	.060
Education level	[913]	.190
Health ratings	[913]	.001
Complexity of medication management	[913]	.556

### Results of the Study

This section presents the study's findings, including a detailed report of descriptive statistics, an evaluation of statistical assumptions, and results of the statistical analyses. The analysis begins with a summary of the sample's demographic characteristics, then assessing assumptions necessary for conducting multiple linear regression. The primary results are then presented and organized by research questions and hypotheses, focusing on the predictors of confidence in avoiding drug interactions among older adults. Post hoc analyses are also discussed where applicable, and the section concludes with an interpretation of the practical significance of the findings and their relevance to healthcare settings.

## Descriptive Statistics

The age of participants ranged from 65 to 80 ( $M = 71.1$ ,  $SD = 4.2$ ,  $Mdn = 70$ ) and was relatively normally distributed (skewness = 0.39, kurtosis = -0.82). As shown in Table 8, the sample had a nearly equal distribution of males and females. The baseline descriptive statistics provide an understanding of the demographic distribution of the participants, ensuring that the sample reflects the population under study.

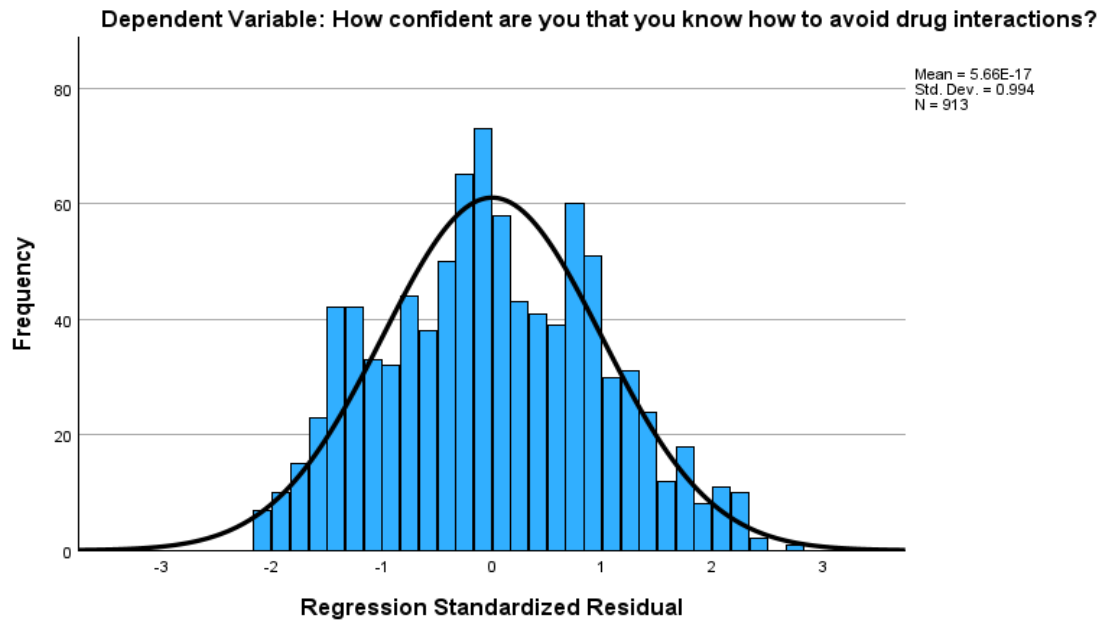
**Table 8**

*Descriptive Statistics of the Sample*

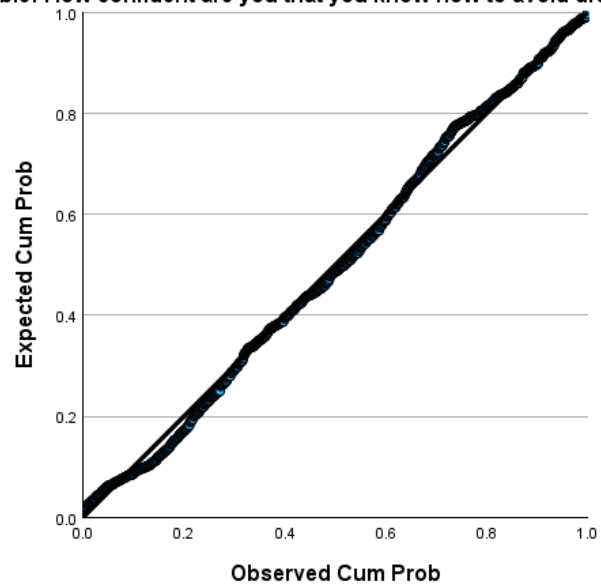
Variable	<i>n</i>	<i>M (SD)</i>	Median	Skewness	Kurtosis
Age	913	71.1 (4.2)	70	0.39	-0.82
Male	451				
Female	462				

## Evaluation of Statistical Assumptions

To ensure the robustness of the regression analysis, statistical assumptions were evaluated. Multivariate outliers were assessed using Mahalanobis distance, with a threshold of 32.909. Six participants exceeded this threshold and were removed from the dataset. After these adjustments, the final sample size was  $N = 913$ . The residuals of the regression analysis were also examined for normality, and no significant issues were found, as confirmed by the histogram and P-P plot of residuals (see Figures 2 and 3, respectively).

**Figure 2***Histogram of Regression Residuals***Figure 3***Normal P-P Plot of Regression Standardized Residuals*

Dependent Variable: How confident are you that you know how to avoid drug interactions?



## Report Statistical Analysis Findings

Multiple linear regression was conducted to determine the extent to which age, sex, race, education level, medication complexity, drug interaction discussions, number of prescriptions, physical health, and mental health predicted confidence in avoiding drug interactions. The overall regression model was statistically significant,  $F(11, 901) = 11.72$ ,  $R^2 = .125$ , accounting for 12.5% of the variance in confidence.

**Table 9**

### *Multiple Linear Regression Results*

Predictor	B	95% CI		<i>t</i>	<i>p</i>	<i>sr</i> <sup>2</sup>
		<i>LL</i>	<i>UL</i>			
Constant	1.245	0.207	2.283	2.353	.019	
Age	0.006	-0.008	0.020	0.870	.384	< .001
Sex	0.081	-0.034	0.197	1.379	.168	0.002
Education level	0.035	-0.017	0.088	1.312	.190	0.002
Complexity of medication	0.042	-0.098	0.181	0.590	.556	< .001
Discussions about drug interactions	-0.445	-0.568	-0.321	-7.069	<.001	0.048
Number of prescriptions	-0.076	-0.175	0.023	-1.505	.133	0.002
Physical health	0.173	0.094	0.252	4.302	<.001	0.018
Mental health	0.213	0.137	0.288	5.531	<.001	0.030
White	-0.208	-0.424	0.009	-1.883	.060	0.003
Hispanic	-0.269	-0.577	0.040	-1.708	.088	0.003
Other race	-0.087	-0.401	0.228	-0.541	.589	< .001

*Note.* CI = confidence interval; *LL* = lower limit; *UL* = upper limit.

### Post Hoc Analysis

Post hoc analyses were conducted to explore the role of race in predicting confidence. A one-way analysis of variance (ANOVA) was performed to investigate differences across racial groups, but it was not statistically significant,  $F(3, 909) = 1.44$ ,  $p$

= .230. This suggests that race may only influence confidence when controlling for other variables in the regression model.

### **Additional Statistical Tests**

No additional statistical tests of hypotheses emerged from the analysis of the main hypotheses.

### **Interpretation of Statistical Findings**

The most important predictor identified was discussing drug interactions within the past 2 years (part  $r^2 = .048$ ,  $p < .001$ ), uniquely accounting for 4.84% of the variance in confidence. Mental health (part  $r^2 = .030$ ,  $p < .001$ ) and physical health (part  $r^2 = .018$ ,  $p < .001$ ) were also significant predictors. These findings indicate that older adults who discussed drug interactions had better mental health or better physical health and were more confident in avoiding drug interactions.

### **Relevance to Research Question**

The null hypothesis was rejected, revealing that factors such as age, sex, race, education level, medication complexity, drug interaction discussions, number of prescriptions, and overall health significantly predicted confidence in avoiding drug interactions.

### **Practical Significance**

These findings have important implications for healthcare providers. The results highlight the critical role of communication about drug interactions, as well as the impact of physical and mental health on confidence. By addressing these factors in healthcare

settings, providers can improve older adults' ability to manage medications safely, ultimately reducing the risk of drug interactions and improving patient outcomes.

### **Summary**

The study explored risk factors affecting older adults' confidence, aged 65 and over, in preventing drug interactions. The average age of participants was 71.1 years, with the majority being White females from diverse educational backgrounds. Most participants managed medium to complex medication regimens, and over half had not discussed drug interactions with their healthcare providers. Most were taking two to three prescribed medications, with nearly 75% rating their physical health as good or very good. However, about 10% of participants lacked confidence in avoiding drug interactions.

The study found that several factors significantly influenced confidence levels, including age, sex, race, education level, medication complexity, number of prescriptions, discussions about drug interactions, and overall physical and mental health. The most significant predictor was whether the participant had discussed drug interactions with a healthcare provider in the past 2 years, followed by mental and physical health. Other factors, such as race and sex, approached statistical significance but were insignificant contributors. The null hypothesis was rejected, indicating a significant relationship between these variables and older adults' confidence in avoiding drug interactions.

Chapter 5 includes an interpretation of these findings, provides recommendations, and discusses implications for social change. The study's fundamental limitation lies in its use of secondary data, which limited control over operationalizing variables.

Furthermore, since the data were collected in 2017, they may not fully reflect current healthcare practices, particularly regarding access to medications for older adults and improvements in communication methods. The next chapter further explores these limitations and the broader significance of the findings.

## Chapter 5: Discussion, Conclusions, and Recommendations

### **Introduction**

This study aimed to address a gap in the literature concerning clinical and healthcare outcomes related to managing drug interactions in older adults. Specifically, the study aimed to identify risk factors that impact older adults' confidence in avoiding adverse drug interactions and to encourage the use of comprehensive clinical guidelines in practice. Key factors examined included age, sex, race, education level, medication complexity, discussions about drug interactions, number of prescriptions, and overall physical and mental health.

The study found that these factors significantly influence older adults' confidence in managing drug interactions, particularly emphasizing the importance of healthcare provider discussions about medications. The findings suggest that healthcare providers should prioritize identifying polypharmacy risk factors and initiate conversations with patients who may be hesitant to discuss their medication regimens. Additionally, assessing both physical and mental health resources thoroughly can help determine the appropriate level of patient autonomy in managing prescriptions, ultimately improving medication management and reducing the risk of adverse drug interactions in older adults.

### **Interpretation of the Findings**

The findings of this study confirm, disconfirm, and extend existing knowledge in the field of medication management for older adults. One of the key findings—that discussing drug interactions with healthcare providers in the past 2 years is the strongest

predictor of confidence in avoiding drug interactions—confirms prior research on the importance of patient-provider communication. This finding aligns with studies that emphasize the critical role of discussions in improving medication safety and adherence among older adults. Furthermore, this study extends the existing literature by showing that better physical and mental health significantly increases confidence in avoiding drug interactions, underscoring the link between overall health status and medication management.

However, the study's finding that White non-Hispanic and Hispanic participants reported greater confidence in avoiding drug interactions than Black non-Hispanic participants contradicts some prior studies, which suggested that racial differences in healthcare access and medication-related confidence might be more pronounced between these groups. This discrepancy highlights the complex relationship between race, SES, and healthcare access, particularly for Black, non-Hispanic older adults, who reported lower confidence levels. These results extend research on healthcare disparities by emphasizing how low income and education contribute to polypharmacy risk, particularly for minority populations, confirming socioeconomic gaps in healthcare access.

Regarding the theoretical framework, the findings align with the social cognitive theory and the health belief model, emphasizing self-efficacy as a critical factor in medication management. The study's results confirm that age, social support, and health literacy influence self-efficacy in managing drug interactions, as older adults with higher confidence were more likely to engage in proactive health behaviors. This suggests that improving communication between patients and healthcare providers can enhance self-

efficacy and reduce adverse drug effects. Additionally, the study confirms that gender differences, with women engaging more in health-seeking behaviors and benefiting more from social support, align with past research on aging and health behavior.

Finally, the study supports the notion that polypharmacy poses a significant risk to cognitive and physical health, particularly among older adults. Consistent with previous literature, this study confirms that managing multiple medications is a growing challenge, particularly in complex medication regimens. The study's findings emphasize the importance of accurate medication lists, discharge summaries, and communication in reducing polypharmacy risks.

This study confirms and extends prior findings on the importance of patient-provider communication, health literacy, and self-efficacy in managing medications among older adults. It also reveals new insights into racial and socioeconomic disparities in confidence levels and the growing challenge of polypharmacy in this population. The rejection of the null hypothesis further underscores the significance of these factors in shaping older adults' confidence in avoiding drug interactions.

### **Limitations of the Study**

Several limitations to the study's generalizability, trustworthiness, validity, and reliability arose from its execution. One of the primary limitations is the reliance on secondary data, which inherently limits control over data collection and variable definitions. As the dataset was created in 2017, the data may not reflect current healthcare practices, policies, or technological advancements, which can affect the relevance of the findings. Healthcare has evolved, especially with an increased focus on telemedicine,

patient communication, and medication management, which may alter the factors influencing confidence in avoiding drug interactions today. The time frame of data collection also limits the generalizability of the findings. The healthcare landscape has likely shifted, and the data may need to accurately represent the current U.S. population or their medication management practices. Additionally, since secondary data restricts control over how variables were operationalized, there could be issues with the validity of certain constructs, such as how confidence or discussions about drug interactions were measured. These limitations may impact the reliability and trustworthiness of the results, as changes in healthcare practices or patient behavior since 2017 may not be captured in the analysis.

To address these limitations and improve the generalizability of future research, more up-to-date data should be collected to better reflect current healthcare practices. This would ensure that the findings remain relevant and applicable to the current population, improving the validity and reliability of the study's conclusions. Additionally, future researchers should aim to design studies where they have direct control over data collection and variable definitions, enhancing the findings' trustworthiness.

### **Recommendations**

Based on the strengths and limitations of the current study, several recommendations for future research are suggested. One key area that requires further exploration is provider training, particularly in addressing polypharmacy and its associated adverse drug reactions in older adults. The study highlighted how inadequate

communication between healthcare providers and older adults can lead to misunderstandings and reduce confidence in managing medications. Future research should focus on interventions that improve provider-patient communication, particularly regarding medication management and drug interactions. This aligns with literature that emphasizes the role of clear communication in enhancing medication adherence and reducing adverse drug reactions (Christopher et al., 2022).

Another important recommendation is to investigate racial and ethnic disparities in medication management and confidence in avoiding drug interactions. The current study found that White non-Hispanic and Hispanic participants reported higher confidence than Black non-Hispanic participants. This suggests that racial differences continue to play a role in healthcare outcomes, even when controlling for other factors. Future studies should focus on exploring these disparities in more detail, emphasizing how socioeconomic factors, healthcare access, and educational interventions can improve outcomes for underrepresented racial groups. Understanding these disparities is crucial for developing culturally sensitive and targeted strategies for improving medication management in diverse populations.

Further research should also examine gender differences in medication management, building on findings that men and women exhibit different aging patterns and health behaviors (Schladitz et al., 2022). Women tend to benefit more from social support, whereas men may focus on physical performance and disease prevention. Future studies could explore how gender-specific interventions, particularly in medication adherence and health literacy, can improve outcomes for older adults.

Additionally, future research should continue exploring the role of self-efficacy in medication management. The social cognitive theory and health belief model emphasize self-efficacy as a critical factor in promoting proactive health behaviors. Future studies should develop and test interventions that enhance self-efficacy, particularly in older adults managing complex medication regimens. This includes exploring technology, such as mobile health applications, to support self-management and improve medication adherence (Farley, 2019).

Lastly, the issue of polypharmacy and the increasing complexity of medication regimens in older adults remains a critical concern. Future research should focus on developing strategies to streamline medication management, particularly in older adults with multiple chronic conditions. This aligns with existing literature highlighting the importance of accurate medication lists, discharge summaries, and provider-patient communication in preventing adverse drug reactions and improving overall outcomes (Caleres et al., 2020).

In conclusion, future research should address these gaps by improving communication between healthcare providers and older adults, exploring racial and gender disparities in medication management, and developing interventions that enhance self-efficacy and medication literacy. These recommendations are grounded in the strengths and limitations of the current study and align with the literature reviewed in Chapter 2, ensuring they remain within the boundaries of the study's findings.

## **Implications**

This study highlighted the negative impact of polypharmacy on older adults, including its association with poor health outcomes, increased hospitalizations, and diminished quality of life. The findings have implications for positive social change across multiple levels while remaining within the study's boundaries.

### **Individual Level**

At the individual level, the study suggests that healthcare providers should receive enhanced training to better recognize and manage polypharmacy in older adults. By tailoring treatment plans to minimize unnecessary medications, providers can improve medication management and help older adults maintain better physical and mental health. Additionally, empowering patients through improved health literacy increases their confidence in managing their medications and advocating for their health.

### **Family Level**

For families, this study underscores the importance of involving family members in healthcare discussions, particularly regarding medication regimens. Health literacy programs aimed at families could empower them to advocate for safer and more appropriate medication use for their loved ones, reducing the risk of adverse drug interactions.

### **Organizational Level**

At the organizational level, hospitals and healthcare facilities could integrate regular medication reviews and mental health assessments into their standard practices for geriatric care. This interdisciplinary approach, involving pharmacists and mental

health professionals, would help address both the physical and psychological impacts of polypharmacy. Protocols prioritizing comprehensive care reviews could improve patient outcomes and reduce preventable hospitalizations.

### **Societal/Policy Level**

On a broader societal and policy level, the findings suggest the need for public health campaigns that raise awareness about the risks of polypharmacy among older adults. Policymakers could prioritize funding for such initiatives and legislate measures that regulate prescribing multiple medications to older adults. Ensuring stricter oversight and accountability in prescribing practices would promote safer medication use and better health outcomes for aging populations.

### **Theoretical and Methodological Implications**

The study also has theoretical implications by reinforcing the importance of self-efficacy, as outlined in Social Cognitive Theory, in managing medication regimens. Methodologically, future research should focus on developing interventions that enhance health literacy and self-efficacy among older adults, particularly in managing complex medication regimens.

### **Recommendations for Practice**

In practice, healthcare providers, particularly those working with older adults, should incorporate regular discussions about medication interactions and polypharmacy risks into patient visits. Training programs for providers should emphasize the importance of comprehensive medication reviews and interdisciplinary approaches to care. Additionally, mental health support should be integrated into standard geriatric care

to address the emotional and cognitive challenges that older adults face in managing multiple medications. These recommendations and implications align with the study's findings. They are grounded in their data, providing a pathway for improving the quality of care and overall well-being for older adults.

### **Conclusion**

The key message of this study is the vital role of communication and support in managing medication and reducing the risks of polypharmacy in older adults. As the population of individuals aged 65 and older continues to grow, their vulnerability to drug-drug interactions, driven by physiological changes and multiple health conditions, increases. Although polypharmacy is widely recognized as a risk factor for poor health outcomes, this study highlights how effective communication between healthcare providers, patients, and caregivers significantly improves confidence in managing medications and avoiding harmful interactions.

By fostering better communication, improving health literacy, and engaging interdisciplinary healthcare teams, healthcare providers can help older adults navigate complex medication regimens, ultimately enhancing their physical and mental well-being. This study reinforces the need for tailored clinical guidelines that prioritize these communication strategies to mitigate the risks associated with polypharmacy. In doing so, it offers a practical path forward for improving the quality of life for older adults in modern geriatric care.

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## APPENDIX

## Appendix A: Power Analysis

Test family		Statistical test	
F tests		Linear multiple regression: Fixed model, R <sup>2</sup> increase	
Type of power analysis			
Sensitivity: Compute required effect size - given $\alpha$ , power, and sample size			
Input Parameters		Output Parameters	
$\alpha$ err prob	0.05	Noncentrality parameter $\lambda$	3.8561579
Power (1 - $\beta$ err prob)	0.5	Critical F	3.8605455
Total sample size	500	Numerator df	1
Number of tested predictors	1	Denominator df	489
Total number of predictors	10	Effect size $f^2$	0.007712316

## Appendix B: Power Analysis for Minimally Detectable Effect Size

Test family		Statistical test	
F tests		Linear multiple regression: Fixed model, R <sup>2</sup> increase	
Type of power analysis			
Criterion: Compute required $\alpha$ - given power, effect size, and sample size			
Input Parameters		Output Parameters	
<b>Determine =&gt;</b>		Noncentrality parameter $\lambda$	
Effect size $f^2$	0.0077519	Noncentrality parameter $\lambda$	3.8759500
Power (1 - $\beta$ err prob)	0.5	Critical F	3.8803330
Total sample size	500	Numerator df	1
Number of tested predictors	1	Denominator df	490
Total number of predictors	9	$\alpha$ err prob	0.0494176
		<input checked="" type="radio"/> From variances Variance explained by special effect .0076 Residual variance .9804 <input type="radio"/> Direct Partial R <sup>2</sup> 0.007692308	
		Calculate Effect size $f^2$ 0.007751938	