MEDICATION ADHERENCE IN THE OLDER ADULT

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by

Ashley E. Shelton

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School of Nursing
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Abstract

of

MEDICATION ADHERENCE IN THE OLDER ADULT

by

Ashley E. Shelton

Statement of Problem

Medication adherence in the older adult population has been a prevalent problem for decades. Hundreds of randomized control trials have been performed in hopes of finding the etiology to this issue with little resolved. To this day the true rate of medication non-adherence is still unknown, often over estimated and biased.

Sources of Data

Using the well-known brown bag method, older adults were asked to bring in their prescribed medications at two separate occasions, two weeks apart to check for adherence rates. After the pill count was completed the older adults were then given a survey regarding factors that affected their medication taking in the past two weeks.

Conclusions Reached

The older adult population is a difficult age group to work with. In conclusion, with the difficulties and limitations faced with participant recruitment, the end result continues to reinforce that medication non-adherence is consistent with a larger body of research.

Dr. Amy Carney, Committee Chair

Date 3/7/14
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Medication Adherence in the Older Adult

CHAPTER ONE: INTRODUCTION

Medication adherence in the older adult has been a prevalent problem for decades, in both developed and non-developed countries (Cardenas-Valladolid et al., 2010). Over the years, hundreds of randomized control trials have been performed in hopes of finding the etiology and solution to this issue yet the literature remains surprisingly weak surrounding this topic. To this day the true rate of non-adherence remains over estimated and biased and furthermore a single solution has yet to be found (Haynes, Ackloo, Sahota, McDonald, & Yao, 2008). This study was designed to determine the true rate of medication adherence in the older adult and to find common etiologies behind non-adherence.

This research study was based on the theoretical framework of Mary Jayne Johnson’s Medication Adherence model (Johnson, 2002). The model has three core concepts associated with it: (a) Purposeful Action, (b) Patterned Behavior, and (c) Feedback (Johnson, 2002). This middle-range theory will be more thoroughly discussed in Chapter two.

Background and Significance

The lack of medication adherence in the older adult population has been an issue with little resolved for several decades. Current estimations of medication adherence are over estimated with admitted biases. Studies have stated adherence rates as high as 70%
but at the same time agree that biases are likely, and estimate the true rate of adherence to be around 50% (MacLaughlin et al., 2005). As the medical community continues to advance, the older adult population will have an “improved life expectancy resulting in people living longer with chronic conditions,” further exacerbating this issue (Robnett, Dionne, Jacques, LaChance, & Mailhot, 2007, p.2). Today, medications are the most common form of therapy prescribed for an older adult (Peron, & Ruby, 2011). Current research estimates that the lack of adherence to these medications costs our healthcare system over $100 billion annually (Mann, 2009). If the population is taking their prescribed medications approximately 50% of the time, a new dilemma is created for practitioners. How does the practitioner decide on treatment without knowing if it is a resistant disease or a resistant patient?

The Problem

People aged 65 years and older currently represent 13% of the US population, averaging more than 1 in every 8 adults. With the “baby-boomers” reaching senior status, predictions theorize that by 2030 this number will increase to 22% of the total US population. In addition, health issues increase with age, “While individuals 65 years and older comprise only 13% of the current population, they account for more than one third the national healthcare budget” (Easom, 2003, p.12).

The lack of medication adherence and its impact is staggering and often unrecognized by most practitioners, with true adherence predicted at only 50% (MacLaughlin et al., 2005). While age itself is not a risk factor for poor adherence, as age increases so does the number of risk factors for non-adherence (George, Elliott, &
Stewart, 2008). In addition, research shows that the longer a drug is required, adherence decreases. In a recent study of over 34,000 participants, only 1 out of 4 participants was still adherent to their statin medication after 5 years (Mann, 2009). This statistic becomes increasingly astounding when multiple medications are added to a regimen as well as different administration times. Researchers and practitioners need to first define the true rate of adherence, and then determine why medication adherence is less than optimal, before they can begin to improve this disparity.

**Purpose of the Research**

The purpose of this study is to identify the true rate of medication adherence in the older adult population and to identify reasons behind non-adherence from the patient’s point of view, using factors identified by previous research. Once etiologies are identified, practitioners can then begin to mend this issue and increase medication adherence.

**Research Questions**

The research questions are (1) “What is the rate of medication adherence in the older adult? (2) What are the factors that affect medication non-adherence?”

**Hypothesis**

In this study population medication adherence will be shown to be less than 50% due to multiple identified factors. These factors are side effects, complex routine, access,
cost, low-health literacy, memory, poor communication, polypharmacy, dexterity, and cognition.

**Research Variables**

The dependent variable in this study population is the rate of medication adherence as calculated by counting the older adult’s pills. The independent variables are the ten different factors found in the literature to affect medication adherence: side effects, complex routine, access, cost, low-health literacy, memory, poor communication, polypharmacy, dexterity, and cognition.

**Importance of the Research**

Many tools have been designed to assess reasons why patients don’t adhere to their prescribed medications; however there is nothing in place to help patients better adhere to their current regimens. A recent systematic review, published in The Cochrane Collaboration, focused on interventions for enhancing medication adherence, noted that the literature concerning interventions to improve medication adherence is “surprisingly weak,” but continued to state that one commonality to all the research is that frequent interaction with patients with a specific emphasis on adherence was essential (Haynes et al., 2008).

There is much room for advancement in the knowledge and treatment surrounding medication adherence in the older adult. Medication adherence is a multi-modal problem that cannot be solved with one simple solution; the solution must also be multi-modal. Each patient is different and has different circumstances surrounding them. Once the
etiology behind the lack of adherence is sought out, practitioners can then begin to discuss the issue specifically (Mann, 2009). It has been reported that “routine assessment of medication adherence in the elderly is rarely performed in everyday clinical practice” (MacLaughlin, et al., 2005, p.251). Routine assessments need to become a regular part of the review of systems that each practitioner does as the beginning of every patient visit. The health status of the older adult isn’t static and therefore there is a need for advanced practice nurses (APN) to continually reassess drug therapy and medication adherence in this population (Peron & Ruby, 2011).
CHAPTER TWO: LITERATURE REVIEW

Introduction

George, Elliott, & Stewart (2008) acknowledged that in the past, the patient-doctor relationship and treatment were centered on ‘compliance.’ Compliance has been defined as “the extent to which a person’s behavior (in terms of taking medications, following diets, or executing lifestyle changes) coincides with medical or health advice” (p.307). This term has a judgmental tone with an unspoken belief that the doctor knows best and the patient should willingly and promptly follow their advice. Today, the focus is being placed on ‘adherence’ and ‘concordance’. Concordance is an agreement between practitioner and patient that is respectful of the patient wishes regarding healthcare concerns. Medication adherence follows in this suit further described by the World Health Organization as “the extent to which a person’s behavior in taking medication corresponds with agreed recommendations from a health care provider” (Mann, 2009, p.10). This belief system, or mutually respectful relationship, between provider and patient is beneficial for medication adherence. However, today many older patients continue to not adhere to agreed upon medication regimens for their health.

Mann (2009) described a common “obstinate problem endemic in the care of the older adults: poor adherence to medication” (p.10). Mann noted that the ability to detect and manage the effects on poor adherence on certain conditions is limited by our poor understanding of what initially drives adherence and effective tools available for diagnosing it. Mann further proposed that the communication breakdown between what
clinicians prescribe and what patient actually take created an enormous toll on our healthcare system currently estimated over as $100 billion dollars annually (2009). It is most often believed that poor medication adherence to medication regimens are not due solely to choice, many factors relating to poor adherence have been identified. These factors can be further divided into three categories such as patient factors, provider factors, and health care system factors, each having their own unique impact on medication adherence (Mann, 2009).

The Drug Regimen Unassisted Grading Scale (DRUGS) was developed to test the hypothesis that the inability of the older adult to correctly take their medication independently may be related to the presence of cognitive impairment (Edelberg, Shallenberger, & Wei, 1999). The DRUGS tool is a combination of the already well validated test of functional status, the Instrumental Activities of Daily Living (IADL), and the “brown bag” test, a commonly used technique for reviewing current medications. The current tool uses a “step-wise progression of four tasks: (1) identification: showing the appropriate medications, (2) access: opening the appropriate containers, (3) dosage: dispensing the correct number per dose, and (4) timing: demonstrating the appropriate time of doses (Edelberg et al., 1999). The DRUGS tool has demonstrated statically significant associations with itself and the Mini Mental State Exam (MMSE), which is commonly used in comprehensive geriatric assessment. This finding suggests that the DRUGS tool has the ability to “identify a subset of community-dwelling older persons with subtle, yet clinically significant, change in his/her level of cognitive function” (Edelberg et al., 1999, p.595). With the use of the DRUGS tool the practitioner is able to
identify specific problems with the individual’s therapeutic regimen immediately allowing for increased education, use of compliance aids, and appropriate follow-up to increase adherence (Edelberg et al., 1999).

The Six-Item Screener (SIS) is another cognitive assessment tool that was designed as a brief screening tool that would balance diagnostic accuracy and logistic demand of screening a large group of subjects in an efficient manner (Callahan, Unversagt, Hui, Perkins, & Hendrie, 2002). The SIS has several advantages over other existing scales in addition to brevity. “First, each of the size items comes from the MMSE, which allows for comparison among many studies utilizing the longer questionnaire. Second, the six-item screener can be administered over the telephone and it is scored simply by summing the number of errors. Third, the diagnostic performance of the scale can be varied by choosing a cut-off score to match the study goals” (Callahan et al., 2002). When used as a first stage screening tool among community-based populations the SIS identified subjects with cognitive impairment as well as the MMSE. A cutoff point of 3 or more errors was comparable to a score of 23 on the MMSE indication dementia to be present (Callahan et al., 2002). In comparison to the DRUGS tool the SIS only took 1-2 minutes to complete, didn’t require any motor skill tasks, visual aids, and required only simple addition of errors.

MacLaughlin et al. (2005) conducted a systematic review on the best methods for assessing medication adherence in the older adult. The specific need for the review was based on the belief “that the impact of medication non-adherence is staggering and often goes unrecognized” (MacLaughlin et al., 2005, p232). Researchers interviewed 315
patients greater than 65 years of age upon hospital readmission. Twenty-eight percent of the readmissions were medication related, 11% were directly associated to a lack of medication adherence and 17% were due to an adverse drug reaction (MacLaughlin et al., 2005). Five different categories were identified as being a potential positive or negative factor in the ability of the patient to properly adhere to prescribed regimens. These categories are: (1) Demographic, (2) Medication, (3) Medication, (4) Behavioral, and (5) Economical. Using these five categories MacLaughlin et al. (2005) identified methods for assessing adherence and then further researched technical aids to assist with adherence. It was proposed that traditional assessment tools, including the DRUGS tool, while still used frequently by providers, often provide inaccurate and unreliable data when used alone. MacLaughlin et al. (2005) also concluded that routine assessment of medication adherence of the older adult is rarely performed in everyday practice; no single tool is reliable and accurate. Lastly, MacLaughlin et al. (2005) proposed the use of both an individualized medication monitoring method as well as a companion clinical outcome (such as blood pressure control) is needed to accurately assess medication adherence and improve health-outcomes.

Haynes et al. (2008) published a systematic review in The Cochrane Collaboration, focused on interventions for enhancing medication adherence and noted that after reviewing hundreds of articles and further scrutinizing 78 randomized control trials, no single intervention was found to solve this dilemma. Out of those 78 trials, 93 different interventions were tested with 41 showing statistically significant increases in medication adherence. However, they also stated that almost all of the effective
interventions were complex, “including more convenient care, information, reminders, self-monitoring, reinforcement, counseling, family therapy, psychological therapy, crisis intervention, manual telephone follow-up, and supportive care” (Haynes et al., 2008, p.17).

Major Variables Defined

Patient Factors. Specifically relating to the older adult patient, are any issues that arise from the patient’s own ability to maintain a regimen. Factors such as memory, cognition, dexterity, low-health literacy, sub-optimal beliefs about their disease or medication, and concerns about possible adverse effects can all play a part in whether or not medication adherence is achieved (Mann, 2009).

Provider Factors. These factors are related to identified interactions with the provider or the provider-patient relationship. Factors such as poor communication skills of the practitioner, complexity of routine, and poly pharmacy have all been identified as issues when dealing with medication adherence (Mann, 2009).

Healthcare System Factors. Everyone in the United States, not solely the older adult, experiences this variable. As issues such as the lack of access, cost of medications, and lack of insurance or coverage are improved, the older adult needs to have special attention given to them and their treatment plan because they are the population living with multiple co-morbid conditions and aggravation of these current health issues (Mann, 2009).
**Theoretical Framework**

As introduced in Chapter One, this research study will be based on the theoretical framework of Mary Jayne Johnson’s Medication Adherence model (Johnson, 2002). The model has three core concepts associated with it: (a) Purposeful Action, (b) Patterned Behavior, and (c) Feedback (Johnson, 2002).

The Medication Adherence model (MAM) was developed to describe the process of medication adherence and further guide health care providers in assessing medication taking in patients with hypertension. While this model was specifically designed for patients with hypertension the researcher intended it to be used for patients with chronic illnesses in general.

The MAM focuses on the idea that two types of non-adherence exist and contribute to medication taking, the intentional decisions to not take medications, and the unintentional decisions or interruptions that cause medications to not be taken (Johnson, 2002). A third concept, Feedback, was later added to the model as it became apparent that intentional and unintentional decisions are affected by a person’s appraisal process. Johnson (2002) used four relevant theoretical frameworks that focus on medication taking and their associated limitations when designing the MAM: (1) Health Belief Model, (2) Social Learning Theory, (3) Theory of Reasoned Action, and (4) Self-Regulation Model.

The Health Belief Model (HBM) was one of the first cognitive theories to address adherence. The HBM suggests that health related behaviors are dependent on the individual’s desire to avoid illness with the belief that a specific action will deter illness
(Johnson, 2002). The HBM states there are four basic principles which must occur before an individual will take action. These principles are: (a) they are personally susceptible to disease; (b) if they contract the disease, the severity will be a significant threat; (c) they will benefit from action taken to reduce their susceptibility to the disease or reduce the severity of the assault; and (d) they will not be required to overcome significant barriers to obtain disease intervention (Johnson, 2002). However results from many studies report inconsistent findings with whether or not health beliefs play a roll between adherence and non-adherence.

The Social Learning theory worked to further expand on the HPM by addressing the issue of self-efficacy (Johnson, 2002). Bandura introduced self-efficacy as a personal belief that one can effectively execute a specific behavior and was thought to determine whether or not a person would make the effort to influence the outcome. While no studies regarding medication adherence were conducted using the Social Learning theory, it is proposed that even with the addition of self-efficacy to the HPM perceived ability does not always result in actual behavior (Johnson, 2002).

The Theory of Reasoned Action proposes that intention to perform behaviors is the immediate predictor for such action. The researchers used the thought process that the intention to become sexually active is the immediate predictor for engaging in such action however this did not work when used in other situations, such as hypertension patients. Results concluded that intention to take prescribed medications was not an actual predictor for medication adherence (Johnson, 2012).
Self-Regulation Model (SRM) further expands on cognitive principles and states that an individual’s desire to self-regulate treatment is decided by perceived changes to their health (Johnson, 2002). The SRM relates four different components relating to an individual’s mental representation of health threats. These components are: (1) Identity, patients label illness and associated symptoms; (2) Cause, or reason for contracting illness; (3) Timeline, for how long the illness will last; and (4) Consequence, the patient will lastly weight the consequence of the disease against the effect of treatment (Johnson, 2002). The SRM helps practitioners to understand a patient’s response to the threat of an illness however it does not address maintaining sustained behavior in chronic diseases when the threat is low.

Current adherence theories were originally developed to address high-threat conditions and not chronic conditions that seemingly have a silent impact on health. Additionally current theories are difficult to apply to current clinical settings. Factors relating to medication adherence in chronic conditions have additional attributes than those of symptomatic conditions. The MAM was developed with these issues in mind and was designed for the asymptomatic chronic conditions that currently plague our older adult population. The three main core concepts identified in the MAM determine to what degree a patient takes their medication as prescribed.

Purposeful Action is defined as the degree to which an individual intentionally decides to take their medications. This decision is based on perceived need, effectiveness, and safety. Perceived need is an individual’s estimation that a medication is needed to maintain and promote health and well-being. Perceived effectiveness is an
individual’s estimation that the medications are effective and the ability to see the change in their own health status. Perceived safety is an individual’s estimation that needed medications are safe and do not pose serious problems for their health.

Patterned behavior is defined as the degree to which an individual initiates and establishes a pattern of taking their medication through access, routine, and remembering. Patterned behavior is the unintentional aspect of the theory. It is proposed that even if a patient fully intended to take their medications, they may still be unintentionally non-adherent because of an interruption of routine or lack of reminders. Access is the individual’s ability to gain access and receive treatment from their providers. This includes the patient’s physical ability to finance, identify, obtain, and ingest their medications. Routine is the individual’s ability to establish a pattern of behavior in timing and location when taking their medications. Lastly, remembering is the method used by patients to recall taking their medications. Obstacles such as needing to take medications at a specific time or having multiple timed doses all contribute to non-adherence.

Feedback is the third domain and defined as the degree to which information, facts, and events reinforce the need to continue to take the medication. This behavior is not stagnant and is influenced by the effectiveness and safety of the treatment. Personal responses, media messages, and information provided by the health care provider are all taken into account in the Feedback domain. Each of these domains is constantly changing and being reappraised by the individual. “The feedback loop affects their
decision to act as well as the pattern of behavior they establish. Patient will maintain or modify adherence to treatment based on feedback (Johnson, 2002, p.188).

**Figure 1.** Mary Jayne Johnson’s Medication Adherence Model.

Summary

In summary many factors play a role in medication adherence, each of them individualized to the specific patient and circumstance. “Medication and medication management are important in the treatment and stabilization of chronic illness (Johnson, 2002, p.190). In order to better assist patient’s with medication adherence and the management of their illness, practitioners need to accurately assess levels of adherence,
and in turn manage and modify the specific reason the patient isn’t maintaining adherence.

**Figure 2.** *Relationship between the Medication Adherence Model (Johnson, 2002) and the major variables in this study.*
CHAPTER THREE: METHODOLOGY

Introduction

Even with numerous studies on medication adherence completed, little consensus and clarification on how to solve the issue has been reached. The majority of research has been concentrated on proper assessment tools and interventions with little actual increase in adherence. Many studies that have investigated medication adherence found it to be around 70% however, many of those studies agree that biases are probable and estimate that the true rate of adherence is only 50% (MacLaughlin et al., 2005). This discrepancy makes diagnosing and properly treating illnesses difficult for practitioners. “The reasoning behind why the patient is not taking his or her medication as prescribed holds the key to improving behavior” (Mann, 2009, p.11). It is most often believed that poor medication adherence to medication regimens are not due solely to choice, many factors relating to poor adherence have been identified. No single intervention or assessment tool will correctly diagnose and treat everyone. Medication adherence is not static and is constantly changing depending on what is simultaneously occurring in the patient’s individual situation.

Additionally, applying Mary Jayne Johnson’s (2002) Medication Adherence model to this issue further expands on the idea that the issue cannot be solved by a single solution. The true rate and individual reasons for non-adherence will be researched in a quantitative descriptive study.
Research Questions

The research questions are (1) “What is the rate of medication adherence in the older adult? (2) What are the factors that affect medication non-adherence?”

Identification of Setting

The setting for the study will be at a local senior center in San Marcos, California. In the fall of 2012, the current estimated population of attendees is 650 people aged 65 and older. These individuals attend the center for classes, meals, and other recreational activities. This center will meet the sampling needs of the study because it’s members are both male and female, over the age of 65 years, live independently, and maintain their own medication regimen at home.

Research Design

The study design used will be a quantitative descriptive study. An in-person interview will be used to collect demographic data, adherence data, and results of the Six-Item Screener (SIS) (Appendix B). After the final pill count, the participants will be asked to complete an in-person survey regarding which factors specifically affected them taking their medication as prescribed in the previous two weeks (Appendix A). After determining the rate of medication non-adherence, a multiple regression analysis will be performed after data collection concerning the identified factors that affect medication adherence.
Population and Sample

The participants will be recruited using convenience sampling methodology. Senior citizens, currently attending the senior center, will be approached by the principal investigator during their time at the center for recruitment. The target population included will be 650 senior citizens. All participants used will satisfy all of the following conditions: must be a member of the San Marcos senior center, age 65 and older, independently living, and English speaking. Seniors who have the following exclusion criteria will be omitted from the study: non-English speaking, any form of cognitive impairment as determined by the SIS, inability to see or read the large font consent form, and if a health professional or family member assists in medication taking.

Using a power analysis the required sample size for this study was calculated to be 65, in order to achieve a power of 0.80 (Plitchta & Kelvin, 2013). Previous research of medication adherence used the average non-adherence rate of 30% as the effect size (Lehane & McCarthy, 2007). The calculated sample size (n=65) provided for a 0.30 effect size in a multiple regression analysis with a significance level of .05. An additional 13 participants will be added for loss factors (e.g. failing to complete the study). Therefore, the desired number of participants will be set at 78.

Definition of Terms

Independently living is defined as living in a residence where the participant or spouse manages medications. Living in a skilled nursing facility, assisted living, hospice
or anywhere a licensed professional handles medications will not be considered independently living for this study.

**Figure 3.** *Power analysis prior to data collection*

(Plitchta & Kelvin, 2013)
Measurement Methods

The study will include the following demographic data: age, sex, and marital status. Demographic data will be collected to later correlate if any of these factors play a role in medication adherence. In addition the following adherence data will be collected: Number of medications prescribed, number of pills for each, dose, route, time, special considerations, prescribed use, does spouse help with medication taking, and adverse effects. The SIS will be given to each participant to ensure no cognitive impairment is present (Appendix B). The SIS is a comparable screening tool to the MMSE and can be used to test for cognitive impairment in adults. A score of 3 or more has been shown as a rough proxy in previous research to identify cognitive impairment when associating it to medication management (Callahan et al., 2002). All of the above-mentioned information will be collected at the second visit. The actual number of pills to be taken for each medication over two weeks will be calculated after the second visit based on the prescribed regimen. After two weeks, the PI will return to the patient’s home for follow-up. The same information will be obtained once again; and a short survey will be given to the participant regarding the major factors affecting their medication non-adherence as described in the literature (Appendix A). The survey was determined to have face validity after three educated, medication-taking individuals independently evaluated the survey and rendered it complete concerning factors that affect medication adherence. Using the survey results, the total number of predictor variables loaded into the regression model will be ten. The variables used will be adverse effects, low health
literacy, complexity of routine, cost, access, memory, cognition, poor communication, dexterity and polypharmacy.

**Data Collection Process**

The PI will approach the director of the San Marcos Senior Center and request permission to recruit participants for the study. Prior to data collection and after obtaining permission from the director, approval from the Institutional Review Board will be obtained. The PI will visit the senior center in the morning at 10am prior to the beginning of any activities. In order to maintain internal validity the study will be explained to the participants as a study regarding the health practices of the older adult population. The true disclosure regarding medication adherence specifically will be avoided to minimize biases by the participants.

At the first visit an information sheet in large font will be provided to each of the participants explaining the suggested study, as well as any risks or benefits. Time will be allowed for the participant to read the information sheet and ask questions and answers during the orientation period. Consent forms will be handed out and a signature will be obtained by all participants that agree to participate in this study, at this point participants will be considered officially enrolled as a subject.

Once the orientation period has ended and consent forms are signed, the PI will screen participants with the SIS to ensure no cognitive impairment is present. If no cognitive impairment is found the PI will set up an appropriate meeting time at the senior center to gather needed information. The information collected will be demographic data to include age, sex, and marital status and adherence data such as number of medications
prescribed, number of pills for each, dose, route, time, special considerations, prescribed use, does spouse help with medication taking, and adverse effects. After the initial meeting and data is collected, another appointment for two weeks from initial meeting date will be set up. At the second meeting, the PI will again count all pills of prescribed medications and ask the patient to fill out a prewritten survey regarding any factors they felt had affected them correctly taking their medications in the past two weeks (Appendix A).

**Data Analysis**

IBM SPSS software (2011) will be used to perform data analysis. The analysis will consist of descriptive statistics, frequency distributions, bivariate correlations, and multiple regression analysis using the F-test. The level of significance will be set at \( p \leq 0.05 \). The level of measurement used when performing data analysis will be nominal and ordinal level data for demographic, adherence data, and the survey. The demographic data obtained will be converted into dummy variables when entering them into IBM SPSS.

Descriptive Statistics will be used to describe the sample being tested and determine mean, median, and mode for each question where appropriate. Frequency distribution will be performed to determine if the data is normally distributed or if the data is skewed in any way. Multiple regression analysis using the F-test will be performed to determine if there is a relationship between the calculated rate of medication adherence and the self-reported factors obtained from the survey. Using this research design will allow researchers to calculate a rate of adherence for seniors at the
San Marcos senior center as well as which self-reported factors affected medication adherence.

Limitations

There are many possible threats to the research design. In an attempt to control the Hawthorne Effect, testing specifically, with Institutional Review Board (IRB) approval, the PI will withhold the true reason for the study in order to keep the participants from changing their normal routine and possibly biasing the study (Polit & Beck, 2012). Maturation and mortality are minimal possible threats to internal validity because the entire study will only take two weeks to complete per participant. External validity threats are also possible, specifically representativeness and generalizability (Polit & Beck, 2012). Using convenience sampling allows for the data obtained to only be generalized to the older adult population at the San Marcos senior center with similar demographic information. Another issue is the when using exclusion criteria such as in this study, data may be unintentionally skewed to only represent the English-speaking population (Polit & Beck, 2012). Lastly it is important to consider that the written survey given at the end of the data collection doesn’t allow for written explanations such as whether the checked factor increased or decreased medication adherence, or if other factors affected the given ones.
CHAPTER FOUR: RESULTS

Introduction

Chapter Four provides the results for the research questions (1) “What is the rate of medication adherence in the older adult? (2) What are the factors that affect medication non-adherence?”

Data was collected over five months. The total number of completed participants was five. Due to the difficulty in obtaining the desired number of participants the initial study was changed to a pilot study. Due to the low participation rate an ad hoc power analysis, frequency distribution analysis, and regression analysis were not performed.

Sample

Participants were recruited and data collected over a five-month period. In that time over 150 individuals were asked to be involved in the research study. Of those individuals, 11 people agreed to be in the study, 8 people completed the first medication count, and 5 people completed the entire study; 3 were male and 2 were female.

Participants

Participant One

93 year old Male, Widowed
Prednisone 15mg orally, every other day-Missed 7 doses
Meclizine 12.5mg orally, as needed for dizziness
Simvastatin 10mg orally, daily at bedtime- Missed 1 dose
Levothyroxine 0.075mg orally, daily- Missed 3 doses

Bayer aspirin 81mg orally, daily- Took 1 extra dose

Participant Two

76 year old Male, Divorced

Oxycodone 5mg/ Acetaminophen 325mg orally, 3 times daily- Missed 3 doses

Potassium Chloride 10meq orally, daily at bedtime- Missed 7 doses

Ibuprofen 800mg orally, 3 times daily after meals-Missed 41 doses

Glipizide 10mg orally, twice daily- Missed 0 doses

Carvedilol 6.25mg orally, twice daily- Missed 0 doses

Simvastatin 40mg orally, daily at bedtime- Missed 0 doses

Furosemide 40mg orally, twice daily- Missed 0 doses

Sitagliptin 100mg orally, daily- Took 1 extra dose

Tamsulosin 0.4mg orally, daily- Missed 0 doses

Doxazosin 4mg orally, daily- Missed 0 doses

Bayer aspirin 81mg orally, daily- Unable to determine

Omeprazole 20mg orally, daily- Unable to determine

Magnesium hydroxide 1000mg orally, daily at bedtime- Missed ½ dose

Participant Three

70 year old female, Divorced

Nature-Thyroid ½ grain orally, daily- Missed 0 doses

Participant Four

71 year old female, Married
Atorvastatin 40mg orally, daily at bedtime- Missed 1 dose
Carvedilol 6.25mg orally, twice daily prn blood pressure >140/80- Missed 1 dose
Losartan 50mg orally, daily at bedtime- Missed 1 dose
Bayer aspirin 81mg orally, daily- Took an extra dose

Participant Five
72 year old male, Married
Simvastatin 40mg orally, daily- Missed 0 doses
Bayer aspirin 81mg orally, daily- Missed 14 doses

The participant’s gender (Table 1) was reported as female (n=2) (40%) and male (n=3) (60%). The participant’s age (Table 2) ranged between 70-93 years of age. The majority of the participant’s marital status (Table 3) was described as either divorced or widowed, as described in chapter one this proposes they live alone and care for their own medication regimens.

Table 1

*Frequency of Participants by Gender*

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<td>Female</td>
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Table 2

*Frequency of Participants by Age*

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<td>76</td>
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<td>93</td>
<td>1</td>
<td>20</td>
</tr>
<tr>
<td>Total</td>
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</table>

Table 3

*Frequency of Participants by Marital Status*

<table>
<thead>
<tr>
<th>Marital Status</th>
<th>Frequency</th>
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<td>0</td>
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<tr>
<td>Married</td>
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<td>40</td>
</tr>
<tr>
<td>Divorced</td>
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<td>40</td>
</tr>
<tr>
<td>Widowed</td>
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<td>20</td>
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<tr>
<td>Total</td>
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</table>
The most frequent medication prescribed for participants (n=7) (88%) was a statin to lower cholesterol.

Table 4
Frequency of Participants by Common Medications

<table>
<thead>
<tr>
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<th>2nd Count (n=5)</th>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>Percent</td>
<td>Frequency</td>
<td>Percent</td>
</tr>
<tr>
<td>Statin (Cholesterol)</td>
<td>7</td>
<td>88</td>
<td>4</td>
<td>80</td>
</tr>
<tr>
<td>Blood Pressure</td>
<td>4</td>
<td>50</td>
<td>2</td>
<td>40</td>
</tr>
<tr>
<td>Thyroid</td>
<td>3</td>
<td>38</td>
<td>2</td>
<td>40</td>
</tr>
<tr>
<td>Blood Thinner</td>
<td>5</td>
<td>63</td>
<td>2</td>
<td>40</td>
</tr>
<tr>
<td>Narcotic (Pain)</td>
<td>2</td>
<td>25</td>
<td>1</td>
<td>20</td>
</tr>
<tr>
<td>Diabetic</td>
<td>1</td>
<td>13</td>
<td>1</td>
<td>20</td>
</tr>
<tr>
<td>Diuretic</td>
<td>2</td>
<td>25</td>
<td>1</td>
<td>20</td>
</tr>
</tbody>
</table>

One participant took their medication as prescribed during the two-week pill count, and it was the only medication prescribed to them. All other participants missed at least one dose or took an extra dose of one of their prescribed medications.
Data Collection and Preparation

After 5 months of data collection, the recruitment time ended with the final pill count of the fifth participant. All data was exported into an Excel spreadsheet. The participants self-selected to be included in the study; data from participants who completed the first pill count was used to gain insight into commonly prescribed medications.

Instruments

The SIS was given to each participant at the beginning of the study to ensure no cognitive impairment was present at the time of recruitment. As described in chapter three, the SIS is a comparable screening tool to the MMSE and is used to test for cognitive impairment in adults. In previous research a score of 3 or more has been shown to identify cognitive impairment when associating it to medication management (Callahan et al., 2002). For this study, a score of more than 2 excluded patients from participating in the study.

Results by Research Question

The research questions were (1)“ What is the rate of medication adherence in the older adult? (2) What are the factors that affect medication non-adherence?”

The true rate of medication adherence continues to elude researchers. Adherence was found to be an issue with at least one medication being taken incorrectly with 80% of the participants (n=4). However, the degree to which this can be generalized to whole populations remains unknown. When questioned regarding which factors affected
medication non-adherence all participants reported “nothing” but would then verbalize questions and concerns about specific medications to the principal researcher leading to questionable results with the survey.

**Summary**

Data collection proved to be more difficult than anticipated; participants were unwilling to participate in this study. It is unclear if anything could have increased participation. Most participants didn’t want to be interrupted during their time at the senior center; others were willing to participate in the study if they could show their medication list and not bring in their actual medications, and finally some failed to complete the second pill count without reason. Most information that can be gained from this research is related to communication and participation barriers when working with older adults.
CHAPTER FIVE: DISCUSSION

Introduction

Data collection and participant recruitment proved to be very difficult. Most people at the senior center were very regimented with their time and any activity that strayed from normal routine was abandoned. The study was presented to possible participants as being related to the health practices of older adults. Attendees were very skeptical about what “health practices” actually meant. A few participants were willing to offer up their medication list but not their actual pill bottles. When the PI explained that the physical medication bottle and pills were needed, more information was requested before agreeing to participate in the study. After 5 months of data collection, the recruitment time ended with the final pill count of the fifth participant. Due to the small sample size the aim of this study was changed to a pilot study focusing on communication barriers and difficulty with participant recruitment in the older adult population.

As with this study, a pilot study is a methodological preface to a larger study, used to determine practicality of methods such as subject recruitment. A pilot study is not synonymous with small sample size; in fact pilot studies can have a large sample sizes. Pilot studies are designed to develop, adapt, or check methods for future research often adding precious information to the literature by highlighting potential pitfalls for other researchers (Foster, 2013). Specifically “trying out strategies for subject recruitment, for example, can be invaluable… projections of available subjects may have
been optimistic, aspects of the physical and political recruitment environments may have been overlooked, and/or strategies may produce an unrepresentative sample” (Foster, 2013, p.1).

**Major Findings by Research Question**

The research questions were (1) “What is the rate of medication adherence in the older adult? (2) What are the factors that affect medication non-adherence?” The data indicates that approximately 80% of patients are not adherent to prescribed medication regimens with all indicating “nothing” affected their medication taking in the past two weeks, leading to the belief that medication non-adherence is consistent with a larger body of research.

The true rate of medication adherence continues to elude researchers with the small sample size it is difficult to conclude more than this. When questioned regarding which factors affected medication non-adherence all participants reported “nothing” but would then verbalize questions and concerns about specific medications to the principal researcher leading to questionable results with the survey.

**Limitations**

A larger sample size would allow for an increase in statistical significance. Changing the recruitment site to a location where participants have more autonomy with their time and the ability to come and go as desired would allow for an increase in involvement. This particular location predisposed my sample to attendees that were obligated to the schedule at the senior center. The majority of the older adults were
brought to the facility by scheduled transportation that brings them for lunch at 10:00am and then returns them home at 11:30am not allowing for extra time to participate in this study. In addition, this senior center possibly predisposes the study to a more dilapidated population which may have been excluded due to cognitive impairment, lack of access to healthcare which would prescribe medications, language barriers, assisted living support, and other individuals that handle their medication for them.

Communication barriers, which were unanticipated, were a substantial issue. Often the older adults were unwilling to be disturbed with anything that deviated from their plans. Some were willing to talk to the principle investigator but insisted on directing the conversation, not relating to the study. Others were very weary about what the PI was “actually” doing and why they were doing it. The original intent of trying to avoid the Hawthorne effect in turn made data collection and participation low.

The written survey given at the end of the study didn’t allow for written explanations relating to specific clarifications as to why the chosen independent variable affected medication adherence. When questioned regarding which factors affected medication non-adherence all participants reported “nothing” but would then verbalize questions and concerns about specific medications to the principal researcher leading to questionable results with the survey.

Lastly, while all participants agreed and were informed that the study involved participation over two weeks with multiple meetings they often would not return for the second meeting and final pill count.

**Generalizability**
As described in chapter three, external validity concerns proved to be apparent. While the original intent of the study only planned to be representative and generalized to older adults attending a San Marcos senior center with similar demographics; in the end, do to the low sample number results aren’t able to be generalized or representative.

**Implications for Nursing Research**

With the difficulties and limitations observed in this study it is imperative that researchers must anticipate difficulty with inclusion. It is also possible that the principle investigator wasn’t asking the “right” questions. Communication with the older adult population is much different than other age groups.

In an article written by the British Journal of Nursing the author proposed that when collecting feedback from the older adult population it is essential to take into account multiple factors many of which aren’t relevant with other populations (Booker, 1997). Brooker proposed that physical and sensory disabilities, fear of repercussions, deficits in intellectual function, spill-over hypothesis, common language, cohort difference in expectations about health care, and institutional ageism are all very relevant to the older adult population (1997). She further went on to state that the older adult population or the “elderly” actually accounts for a 40-year range in age, with each different cohort having different beliefs and expectations about what health care should be. This was apparent in the research when speaking with participants who said they had no issues with taking their prescribed medications but would later indicate that they didn’t know what the medication was for or if it even worked. This particular age group
is more passive and accepting of healthcare decisions because when they were growing up it was the expectation that you did what the doctor told you without question.

Another factor, which might have improved this research, is to take into account the way the information was collected. The PI went to the senior center during the older adults lunchtime when they had limited time to sit, socialize, and eat before it was time to leave again. Information was collected at the individual’s own table with multiple friends and other attendees present. Booker proposed that special attention should have been given to privacy and comfort. “A one-to-one structured interview in a setting that is physically comfortable for the older person (remember chair heights, lighting and temperature) and free from background noise, backed up with the use of visual prompts and large-print scales, is likely to achieve more reliable results than a questionnaire” (Booker, 1997, p159).

In order to provide acceptable healthcare for the older adult it is essential to find a dependable method of obtaining reliable data, more research is needed into communication and data collection when working with this special population.

**Recommendations for Future Research**

Of the older adults who agreed to participate, most information was found during casual conversation and not when they thought they were participating in data collection. It may be beneficial in the future to collect data in a casual manner where the principle investigator asks likert-scale type questions and fills out a survey themselves; allowing for note taking if the older adult elaborates on the answer (Appendix C).
Other options for increasing participation and sample numbers are to decrease the number of meetings and remove the pill count from the data collection. It was found after data collection that the desired information could have been obtained through a one-time written likert scale type survey (Appendix C).

Summary

In conclusion, with the difficulties and limitations of this study it is recommended that this study and other pilot studies be framed in a way to offer what was learned, with the limitations a major portion of the paper so as to avoid drawing conclusions with inadequate data and in turn assist future researchers in what not to do (Foster, 2013). It was again reinforced, as with previous research, that medication adherence in the older adult population is a common issue with true adherence rates over estimated. The older adult population is a difficult age group to work with. Communication and participation barriers will continue to be a barrier to research in this population until successful data collection methods are found. The end result continues to reinforce that medication non-adherence is consistent with a larger body of research.
Appendix A

Survey

Check each factor that affected you taking your medications as prescribed in the last 2 weeks:

- Side Effects
- Complex Routine
- Access to Medication
- Cost of Medication
- Forgot to take Medication
- Don’t think I need it
- Doctor didn’t explain need well enough
- Too many Medications to take
- Can’t get pills out of container
- Don’t know
Appendix B

Six-Item Screener to Identify Cognitive Impairment*

Script:
I would like to ask you some questions that use your memory. I am going to name 3 objects. Please wait until I say all 3 words, then you repeat them. Remember what the 3 objects are because I am going to ask you to name them again later.

1. APPLE
   Recall: Yes □ No □
2. TABLE
   Recall: Yes □ No □
3. CAR
   Recall: Yes □ No □

Now I’m going to ask you a few basic questions.

- What is the year? Correct: Yes □ No □
- What is the month? Correct: Yes □ No □
- What is the day of the week? Correct: Yes □ No □

* Use an additional set of questions, such as verifying name, address and phone number a distractor. Allow 3 minutes to pass before asking for recall.

What were the 3 objects I asked you to remember?

4. APPLE
   Recall: Yes □ No □
5. TABLE
   Recall: Yes □ No □
6. CAR
   Recall: Yes □ No □

6 Item Recall Summary: Number of objects missed (only choose one).

1. □ 2. □ 3. □ 4. □ 5. □ 6. □

Do responses indicate cognitive impairment?

Scoring: A score of 2-3 missed indicates a need for further screening and diagnostic testing.
Appendix C

Medication Survey

Age___________

Sex___________ (M/F)

-Approximately how many medications are prescribed to you? __________

-In the past seven days have you forgotten to take your medications? __________(Y/N)

-In the past seven days have you decided not to take your medications? ________(Y/N)

-Do you organize your pills in a type of organizer? _________ (Y/N)

-What is the primary reason for your medications?
  -Heart problems
  -Diabetes
  -Thyroid
  -Pain
  -Skin Issue
  -Neurological Issue
  -Eye Issue
  -Urinary Issue

-How do you rate your overall health?

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<tr>
<td></td>
<td>10</td>
<td>Very Unhealthy</td>
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<td>Very Healthy</td>
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-How do you rate your overall health?

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<tr>
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-How do you rate your overall health?

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-To what extent are you adherent to your medications?
To what extent do you understand the purpose of your medications?

- Over the past 7 days, to what extent do you feel side effects affected if you took your medications as prescribed?

- Over the past 7 days, to what extent do you feel the complexity of the routine affected if you took your medications as prescribed?

- Over the past 7 days, to what extent do you feel access to your medications affected if you took your medications as prescribed?

- Over the past 7 days, to what extent do you feel the cost of your medications affected if you took your medications as prescribed?

- Over the past 7 days, to what extent do you feel the number of medications you must take affected if you took your medications as prescribed?
Over the past 7 days, to what extent do you feel the difficulty of opening the pill bottle affected if you took your medications as prescribed?

0 1 2 3 4 5 6 7 8 9
10 Never
Always
References


