Self-Efficacy and Medication Adherence of Individuals with Vision Impairments

by

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A dissertation submitted to the Graduate Faculty of
Auburn University
in partial fulfillment of the
requirements for the Degree of
Doctor of Philosophy

Auburn, Alabama
May 9, 2015

Self-efficacy, vision impairment, medication management, medication adherence

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Abstract

The purpose of the study was to investigate the self-efficacy and medication adherence of individuals with vision impairments who were served at the time by one or more of the three non-profit consumer organizations that provide advocacy and other services for individuals with vision loss in Georgia. In addition, the study examined an individual's confidence associated with tasks such as ability to ready medication labels, ability to take medications as prescribed, and use of assistive technology aids when managing their medications.

In conducting the study, the researcher selected three non-profit consumer organizations whose focus is to provide advocacy services to individuals with vision loss. The researcher contacted each president of the three local non-profit consumer organizations that provide advocacy services for individuals with vision impairments by telephone to request the organization's participation in the study and to provide information on the purpose of the study.

A formal letter was e-mailed to each president to reiterate the purpose of the study and to request support. In addition, a request was made for permission to attend one monthly meeting of each organization to inform the members of the project and to solicit participation in the study.

All participation was voluntary. The survey instruments were self-reported and were to be completed independently or with the use of a proxy (family member or friend). After completing the surveys, participants placed surveys in the drop box at the meeting of their organization. The survey data remained anonymous. The total number of individuals with impairments in the data set was 52.

Individuals with vision impairment demographic variables were as follows: (a) gender, (b) type of vision impairment, (c) marital status, (d) age range, (e) education, (f) current employment status, (g) housing arrangement, (h) travel independently outside the home (yes, no), (i) travel methods, (j) assistance in taking medications, (k) use of assistive technology to take medication, (l) ability to read large print on newspaper headings, (m) ability to read small print on newspaper, (n) ability to read medication labels, (o) ability to see the medication pills, and (p) requires the assistance of others in reading. Participants also responded to four open-ended questions that addressed their coping skills. The researcher organized comments into central themes. All participant responses provided implications for the results.

Results from the statistical analysis showed that in terms of individuals with impairments confidence level, participants were ‘somewhat’ to ‘very confident’ in taking their medication independently.   There was no statistically significant difference in following prescribed medication regimens or refilling their medication on schedule, and there was no difference in the confidence level of those who used assistive technology/aids and those who did not use assistive technology in taking their medication. This finding indicated individuals felt confident in managing their medications at the .05 level; however, the finding also implied that they had challenges in being able to manage their medication regimens independently.

Acknowledgements

I wish to acknowledge and express my sincere gratitude to my committee members, Dr. Rebecca Curtis (Chair), Dr. Marie Kraska, and Dr. E. Davis Martin for their continued guidance words of encouragement, and support throughout this most challenging process. I am also very grateful to Dr. Kraska for her commitment to me, her endurance, support, and direction, as well as her guidance and belief in me throughout this process. I would also like to thank my outside reader, Dr. Elisha Wohleb, for her insight and assistance in this momentous endeavor.

Special acknowledgements go to my family. Thanks to my mother and father, Ruth and Isaac Tazewell who left me during this process but believed strongly in the education process. They supported me in every way possible, and their wisdom and beliefs encouraged me throughout this process. My sisters, Patricia Young, and Camellia M. Owens, thank you for continuing to push me. In addition, my brothers Isaac and Irwin Tazewell, thank you for your support during our most difficult period. Thanks for the continuous prayers of my four sisters and for asking God to guide and walk with me. Without Him this would not be possible.

An unlimited amount of gratitude goes to my dear husband, Dr. Ralph Noble, who has encouraged me, stood by me every step of the way, and always had words of encouragement in the mist of various challenges. Special thanks to him for always being available to share, provide encouragement, and provide necessary guidance to me in my goal. I am truly thankful. Finally, I would like to thank my good friend Leverta Peeples for always providing a positive outlook on why I must continue to complete this process, in our efforts to advocate for others.

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List of Abbreviations

ACB	American Council of the Blind
AFB	American Foundation of the Blind
ADL	Activities of Daily Living
ADS	Adherence Demographic Survey
ARMS	Adherence to Refills and Medication Scale
ACM	American Council of the Blind
AOA	Administration on Aging
BVA	Blinded Veterans Association
BVAGRG	Blinded Veterans Association Georgia Regional Group
CDC	Center for Disease Control and Prevention
CMS	Center for Medicare and Medicaid Services
GCB	Georgia Council of the Blind
ICD	International Classification of Disease
NEI	National Eye Institute
NFB	National Federation of the Blind
NIH	National Institute of Health
SEAMS	Self-Efficacy for Appropriate Medication Use Scale
WHO	World Health Organization

CHAPTER I. INTRODUCTION

Vision impairment is considered one of the ten most frequent causes of disability in the United States according to the National Institute of Health/National Eye Institute (NIH/NEI, 2004; Center for Chronic Disease and Prevention Control [CDC], 2012). Visual impairment is also considered one of the most feared disabilities (CDC, 2012). It compromises one's quality of life because it reduces one's capacity to read, feel comfortable in taking medications, driving a car, and managing personal accounts. Vision impairment also isolates individuals from many of the activities they enjoy doing. Without the help and assistance of family and friends, adjusting to vision loss can be very difficult (Administration on Aging [AOA], 2006; CDC, 2012).

Vision impairment can be devastating and often, every day activities such as taking medications, caring for a child, caring for ailing parents, reading necessary information, succeeding at work, and traveling to familiar as well as unfamiliar places can be very challenging (American Foundation for the Blind [AFB], 2005; Lombardi & Kennicutt, 2001; McMahon & Curtis, 2009). The experience of losing one's sight is difficult and it requires assistance to adjust to vision loss. Individuals with vision impairments must be educated on new and different ways of doing things to regain their confidence and independence in daily activities (Lauerman, 2000). Learning new ways of doing things is helpful and requires the assistance of trained professionals in the field (Lauerman, 2000; Weeraratne, Opatha, & Rosa, 2012; Zagar & Baggarly, 2010).

Accessible information on medication is critical to the safety, privacy, and independence of individuals with vision impairments (American Council of the Blind [ACB], 2012; AFB, 2005, 2014; Osterberg & Blaschke, 2005). Individuals with vision impairments have the right to manage their medications independently. They also have the right to access information and to feel confident that they are taking their medication safely, securely, and as prescribed by their health care provider (ACB, 2012; Weeraratne, Opatha, & Rosa, 2012; Feinberg, Rogers, & Sokol-McKay, 2009). For many individuals, the inability to read their medications puts them at serious risk of taking the wrong medications, at the wrong time, and in the wrong amount (ACB, 2012; Drummond, Drummond & Dutton, 2004).

An important problem facing today's healthcare systems is the failure of patients to take their medication as prescribed (AFB, 2005; McFeely, 2009; Yamdagni, Bhaheetharan, Dunn & Fahimi, 2007). Among patients with chronic illness, approximately 50% do not take their prescribed medications as indicated. This lack of adherence is especially true for the elderly (Brown & Bussell, 2011). Taking medications several times throughout the day or just forgetting to take the medications often contributes to nonadherence (AFB, 2005, 2014; Osterberg & Blaschke, 2005; Yamdagni, Bhaheetharan, Dunn & Fahimi, 2007).

The World Health Organization (WHO) noted that increasing the effectiveness of adherence interventions may have a far greater impact on the health of the population than any improvement in specific medical treatments (Brown & Bussell, 2011; Brown, Brown, Sharma, Brown, Gozum, & Denton, 2000; Osterberg & Blaschke, 2005). Poor medication management or adherence has many factors that may include, but are not limited to, the patient's confidence level, health literacy, lack of involvement in the treatment and/or decision-making process, physician-related issues, prescriptions for complex medication regimens, communication barriers, ineffective communication of information about adverse effects, and provision of care by multiple physicians (Brown & Bussell, 2011; Maibach & Murphy, 1995). Other factors related to healthcare nonadherence may include office visit time limitations, lack of health information, lack of assistive technology, and limited access to care as well as access to information regarding one's care (AFB, 2014; Brown & Bussell, 2011; Smith, Allen, & Blair, 2006). Poor medication adherence often leads to negative outcomes and can also lead to increased morbidity and death. Poor medication adherence is estimated to incur $100 billion per year in costs (Brown & Bussell, 2011; Osterberg & Blaschke, 2005). Medication taking behavior can be extremely complex, requiring several strategies to improve medication adherence (AFB, 2005; Brown & Bussell, 2011).

WHO reported that medication adherence is a key factor associated with the effectiveness of medication therapies (Brown & Bussell, 2011). Between one-third and two-thirds of all medication-related hospitalizations that occur in the United States are due to poor adherence to medication (Brown & Bussell, 2011; Osterberg & Blaschke, 2005). WHO reports that improving adherence to medical therapy for conditions such as hypertension and diabetes reflects very important economic and health-related benefits (Brown & Bussell, 2011). There are many factors that cause a decrease in adherence to medications. WHO has classified these factors into five categories: socioeconomic factors, healthcare team factors, health system factors, therapy-related factors, and disease-related factors (Brown & Bussell, 2011; Lee, Grace, & Taylor, 2006; Sabate', 2003).

Many individuals with vision impairments are presented with an overwhelming amount of information regarding their need to adhere to various medication regimens. Individuals with vision impairment may find it difficult to understand and are unable to accurately follow the medication regimens (ACB, 2012; AFB, 2005; Feinberg, Rogers, & Sokol-McKay, 2009; Gatti, Jacobson, Gazmararian, Schmotzer, & Kripalani, 2009). The inability of individuals to feel comfortable in taking their medications appropriately, beliefs regarding their need for medications, or inability to access health-related information are barriers to receiving optimum health care (Jeppesen, Coyle, & Misser, 2009; Maibach & Murphy, 1995). Difficulty in this area can be especially true for individuals with vision impairments who often have difficulty accessing information in printed formats (AFB, 2014; Drummond, Drummond, & Dutton, 2004; Feinberg, Rogers, & Sokol-McKay, 2009).

Colbert, Sereika, and Erlen (2012) noted that self-efficacy may influence beliefs regarding one's ability to correctly take their medications. They also found that self-efficacy mediated the relationship between one's belief regarding health-related information and medication adherence. The concept of self-efficacy was derived from Bandura's Social Cognitive Theory (Bandura, 1977a). Bandura described self-efficacy as a cognitive process involving judgment of one's ability to perform specific behaviors required to produce identified outcomes (Bandura, 1997; Chlebowy & Garvin, 2006; Maddux & Rogers, 1983; Maibach & Murphy, 1995).

Bandura noted that self-efficacy is the link between one's self-perceptions and individual actions (Bandura, 1997a). For individuals with vision impairments, their ability to feel comfortable with taking their medications, access to health information, and understanding of health instructions may significantly influence their confidence and motivation to take their medications (Colbert, Sereika, & Erten, 2012).

Self-efficacy has assumed a very important role in health care interventions (Maddux & Rogers, 1993). Health care interventions are often enhanced by self-efficacy, which also fosters positive health-related behaviors (Bandura, 1977b; Maibach, Flora, & Nass, 1991). Self-efficacy theory has aided in understanding various chronic disease-related behaviors. It has aided in facilitating behavioral change in individuals in regards to their treatment (Lentz & Shortridge-Baggett, 2002; Pajares, 2002).

Having confidence and believing that the medications prescribed will improve one's condition can influence patients to maintain an effective treatment plan (Drummond, Drummond, & Dutton, 2004; Gatti, Jacobson, Gazmararian, Schmotzer & Kripalani, 2009). It is important for individuals with vision loss to understand that an important part of their treatment plan consists of taking their medications. They must to be able to access available information regarding their medications. They must also know what medications to take, why they are taking certain medications, and when they need to take their medications (Gatti, Jacobson, Gazmararian, Schmotzer & Kripalani, 2009; Prime, 2012).

Ngoh (2009) noted that having the necessary health information is an important component of both cognitive and functional skills that are needed to adequately take one's medication appropriately. However, patients that lack appropriate health information are more likely to take medications inadequately or be non-adherent (Georges, Bolton, & Bennett, 2004; Ngoh, 2009). Despite the availability of effective medications to address many of the current health care concerns, greater awareness of the importance of adhering to medication treatment regimens is necessary for all patients. Particular attention should be addressed to individuals with vision impairments. Patient nonadherence to prescribed medications and treatment therapy continues to be a problem when addressing the needs of individuals with vision impairments (Sleath et al., 2006; Taylor, Galbraith & Mills, 2002). Patient nonadherence to medication regimens accounts for substantial worsening of diseases, death, and increased health care cost in the United States (Osterberg & Blaschke, 2005).

Statement of the Problem

Individuals with vision impairments face challenges in being independent in self-managing their medications. Mark Rickert of the American Foundation for the Blind (AFB, 2007) noted that individuals with vision loss who are unable to access information for their healthcare, particularly on prescription labels, may experience serious consequences.

There is a paucity of research and literature related to self-efficacy and medication adherence of individuals with vision impairments. In addition, a great deal of uncertainty exists about factors that influence medication adherence for individuals with vision impairments (Weeraratne, Opatha & Rosa, 2012). The importance of health related information for these individuals is imperative (Weeraratne, Opatha & Rosa, 2012). Information related to healthcare may be helpful in influencing individuals to take their medications as prescribed. Consequently, the focus of this research is the lack of information related to self-efficacy and medication adherence of individuals with vision impairments.

Purpose of the Study

The purpose of this study was to investigate the self-efficacy and medication adherence of individuals with vision impairments. The purpose was further delineated by investigating an individual’s confidence associated with tasks such as ability to read medication labels, ability to take medications as prescribed, and use of assistive technology when managing medications (Drummond, Drummond & Dutton, 2004; McMahon & Curtis, 2009).

This study contributed to the body of knowledge by addressing the confidence level of individuals with vision impairments in taking their medications, access to medical information, willingness to adhere to a medication regimen, and the overall self-adherence to medication regimens (Drummond, Drummond & Dutton, 2004; McMahon & Curtis, 2009).

Research Questions

The purpose of this study will be explained by six research questions. The research questions addressed in this study are:

1. What are the demographic and personal data related to medication taking selected for this study in terms of:

    (a) Gender (male, female),

    (b) Type of vision impairment (cataract, glaucoma, macular degeneration, retinitis pigmentosa, diabetic retinopathy, trauma, and other),

    (c) Marital status (married, single, divorced, widowed),

    (d) Age Range (22–30; 31–39; 40–48; 49–57; 58–66; 67–75; 76–84; 85 and over),

    (e) Education level (high school, GED, some college, college graduate, master’s, beyond master’s degree),

    (f) Current employment status (full-time, part-time, unemployed, homemaker, retired, student, volunteer),

    (g) Housing arrangement (lives alone, lives with spouse, lives with other family member, lives with friend, lives in residential facility),

    (h) Travel, independently outside the home (yes/no),

    (i) Travel methods (car, taxi, bus, wheelchair, mobility cane, sighted guide, special mode of transportation, walk alone, electric wheelchair, push wheelchair, use of support cane)

(j) Assistance in taking medications (yes/no),

(k) Use of assistive technology to take medication (yes/no),

(l) Ability to read large print on newspaper headings (yes/no),

(m) Ability to read small print on newspaper (yes/no),

(n) Ability to read medication labels (yes/no),

(o) Ability to see the medication pills (yes/no),

(p) Requires the assistance of others in reading (yes/no).

2. In addition, further information will be collected for the following four open-ended questions:

(a) What coping methods do you use in taking your medications?

(b) What are the greatest barriers to taking your medication?

(c) If you missed or have not taken your medications, what have been the consequences?

(d) What assistive technology do you use to take your medications?

3. To what extent do individuals with vision impairments follow their prescribed medication regimens as measured by the Adherence to Refills and Medication Scale (ARMS)?

4. To what extent do individuals with vision impairment refill their medications on schedule as measured by the Adherence to Refills and Medication Scale (ARMS)?

5. To what extent do individuals with vision impairments feel confident in their ability to manage their medication independently, as measured by the Self-Efficacy for Appropriate Medication Use Scale (SEAMS)?

6. To what extent is there a difference in the confidence level of individuals with vision impairments who use assistive aids in taking their medications and individuals who do not

use aids to access medications as measured by the Self-Efficacy for Appropriate Medication Use Scale (SEAMS)?

Statement of the Hypotheses

The following null hypotheses were formulated to respond to research questions 2, 3, 4, and 5. Each null hypothesis will be tested at the .05 level of significance.

Ho_1: There is no statistically significant difference in observed scores and the test value of 10.33, the median score on the subscale of Adherence to Refills and Medication Scale (ARMS) set by the scale developers for individuals who follow their prescribed medication regimens.

Ho_2: There is no statistically significant difference in observed scores and the test value of 5.99, the median score on the subscale of Adherence to Refill Medication (ARMS) set by the scale developers for individuals who refill their medication on schedule.

Ho_3: There is no statistically significant difference in observed scores and the test value of 26, the midpoint on the Self-Efficacy for Appropriate Medication Use Scale (SEAMS).

Ho_4: There is no statistically significant difference in mean scores on the Self-Efficacy for Appropriate Medication Use Scale (SEAMS) of individuals with vision impairments who use assistive aids in taking their medications and those who do not use assistive aids.

Design of the Study

This study was a survey designed to investigate self-efficacy among individuals with vision impairments. The study investigated individuals with vision impairments’ confidence in taking their medications, their ability to adhere to taking prescribed medications, and their ability to meet scheduled appointments. In addition, coping methods and health literacy of individuals with vision impairment will be explored. Participants for the study will be volunteers who are members of one of the three local organizations for the blind in the southeastern region of the United States.

The dependent variables are medication adherence and ability to meet scheduled appointments as measured by the Adherence to Refills and Medication Scale (ARMS) and the Self-Efficacy for Appropriate Medication Use Scale (SEAMS). Coping skills associated with taking medication are measured by four open-ended responses on the Adherence Demographic Survey (ADS).

Sources of Data

Sources of data were collected from three organizations supporting individuals who are blind or visually impaired located in the southeastern region of the United States. Each organization is a resource for information as well as a network of services for the visually impaired. The organizations are also key in advocating for their members and helping to address issues through legislative actions.

The population for this study consisted of volunteers from the local membership in each of the organizations. The participants responded to the surveys as self-reported (independently) or by using a proxy. Participants who volunteered to complete the surveys were from one or more of the following three local organizations: Georgia Council for the Blind (GCB), Blinded Veterans Association Georgia Regional Group (BVAGRG), and the National Federation of the Blind of Georgia Chapter. An individual who is served by more than one of the organizations will be permitted to respond to each of the surveys only once. The researcher obtained permission from each of the participants who provided data for this study.

Presidents of each of the local organizations were identified; permission was requested to solicit participants for the study. The researcher emailed a letter to each of the presidents of the local organizations requesting their support for the study. Also, the presidents were asked to identify one meeting date in which the researcher could administer the surveys after their local meeting.

Definition of Terms

Adherence is used to describe the extent to which an individuals' behavior in taking medication is in agreement with the recommendations of their health care provider (American Society on Aging [ASA], 2012; Asterberg & Blaschke, 2005; Steiner & Earnest, 2000).

Blindness refers to visual impairments ranging from legal blindness to total blindness (Carithwaite, 2002; Ponchillia & Ponchillia, 1996).

Coping skills or strategies refer to the specific efforts, associated with both behavioral and psychological efforts, that people use to master, tolerate, reduce, or minimize stressful events. There are two general coping strategies that have been recognized. They are problem-solving strategies that are efforts to do something active to alleviate stressful circumstances, and emotion-focused coping strategies that involve efforts to regulate the emotional consequences of stressful or potentially stressful events. Research has shown that people use both types of strategies to combat most stressful events (Folkman & Lazarus, 1980; Taylor, 1998).

Legal blindness is defined as a person having 20/200 or worse in the better eye (with best eyeglass or contact lens correction) or visual field restricted to 20 degree or less in diameter in the better eye (Andrew, 2008; Carithwaite, 2002; Ponchillia & Ponchillia, 1996; Koestler, 1976).

Low vision – A degree of vision loss that is functional but limiting enough to interfere with one's ability to perform everyday activities and that cannot be corrected with standard eye glasses or contact lenses (Andrew, 2008; Carithwaite & Garner, 2002; Lamourex, Hassell, & Keeke, 2004).

Self-efficacy refers to individual belief in one's capability to organize and execute a course of action required to deal with different situations (Bandura, 1993; DeVellis & DeVellis, 2000; Schwarzer & Luszczynska, 2005). Self-efficacy also expands to include confidence in one's capability to regulate their motivation, emotional levels, thought processes, and social environments, to achieve a desirable level of behavioral attainment (Bandura, 1993; Hofstetter, Sallis, & Hovell, 1990).

Visual acuity is defined as the ability to distinguish details and shapes of objects with good contrast. This is also called central vision. Visual acuity is recorded as one's test distance size. For example, if a person has a 20/200 visual acuity, the person must be 20 feet away from an object to see the same object that a person with normal vision could see at 200 feet (Carithwaite & Garner, 2002).

Visual field is considered the area that an individual sees when their eyes are looking straight ahead. This area includes both the central and peripheral area of vision (Carithwaite & Garner, 2002). For individuals that have visual acuity of better than 20/200 in the better eye, the visual field of the eye to meet U.S. definition of legal blindness is 20 degrees or less (widest diameter) (Andrew, 2008; Carithwaite & Garner, 2002).

Visual impairment is any degree of vision loss (also includes total blindness) that impacts an individual's ability to perform daily life activities (Andrew, 2008; Carithwaite, 2002; Ponchillia & Ponchillia, 1996).

Limitations of the Study

The following limitations will apply to this study.

1. For purposes of this study, individuals with vision impairments are defined as those individuals diagnosed as low-vision to blind.
2. The population for this study was limited to individuals in the following organizations for the blind: (1) Georgia Council for the Blind, (2) Georgia Regional Group of the Blinded Veterans Association, and (3) Georgia Chapter of the National Federation of the Blind.
3. The results of this study may not be representative of individuals with vision impairments who are members of other groups throughout the United States since the sample for this study was obtained from only the three organizations for the blind in the State of Georgia.

Assumptions of the Study

The following assumptions apply to this study:

1. Individuals who participated in this study were representative of other individuals with vision impairments who were served by one of the three organizations for the blind from which this sample was taken.
2. Participants in this study responded to all items on the survey honestly.
3. Participant characteristics may vary based on type of visual impairment (such as macular degeneration, glaucoma, cataract, retinitis pigmentosa, and so on); gender; marital status; age range; current employment status; and education level.
4. Participants can self-assess their efficacy to take their medications as prescribed.

5. Individuals participating in this study were able to self-report their responses using a typed large print survey form, assistive technology, or a proxy.

Need for the Study

The researcher could find no research or literature related to self-efficacy and independent medication administration among individuals with vision impairments. This lack of information indicates an obvious gap in the literature that results of this study may help to fill. Such information may be useful to health care providers, pharmacists, counselors, caregivers, and family members in assisting individuals with vision impairments to feel confident to manage their own medications and to follow a prescribed regimen (AFB, 2008a, 2014).

The majority of medical information for prescription drugs is provided in print and communicated in writing (AFB, 2014; Drummond, Drummond, & Dulton, 2004). However, little attention has been given to whether individuals with vision impairments are able to access information in written form. In addition, individuals with vision impairments may lack confidence in taking their medications. They are often unable to access written instructions associated with their health care (Drummond, Drummond, & Dulton, 2004; Gatti, Jacobson, Gaznararian, Schmotzer, & Kripalani, 2009; Shrank, Avorn, Rolon, & Shekelle, 2007).

There is a need for health care providers to address the challenges associated with their interactions with individuals with vision impairments. Not having access to information regarding their health care needs may contribute to non-adherent medication behaviors. The National Federation of the Blind (2004) noted that parents with vision impairments experience problems in providing medications to their children. For example, individuals with vision impairment have been hospitalized because they are unable to see their insulin labels (Weeraratne, Opatha & Rosa, 2012).

Significance of the Study

Results of this study may contribute to the existing body of knowledge by addressing the overall self-efficacy of individuals with vision impairments to take their medications, access medical information, and adhere to a medication regimen (Drummond, Drummond & Dutton, 2004; McMahon & Curtis, 2009). Therefore, this research should help to fill a gap in information related to self-efficacy and medication adherence for individuals who have blindness and/or with impaired vision. Specifically, there is a gap in the research and literature addressing the extent to which individuals feel confident to administer their own medications. Individual knowledge of prescribed medication regimens, along with meeting scheduled appointments, should help individuals better understand the importance of adhering to their recommended health care plan.

Lack of self-efficacy and willingness to follow a prescribed medication regimen may contribute to non-adherence to a treatment plan (Friedman, et al., 2008; Gatti, Jacobson, Gazmararian, Schmotzer & Kripalani, 2009; Weeraratne, Opatha & Rosa, 2012; Windham, et al., 2005). It is critical that healthcare professionals understand the challenges and barriers to self-efficacy in managing medication regimens to better serve these individuals with vision impairments (Windham, et al., 2005).

CHAPTER II. REVIEW OF LITERATURE

The number of Americans with major eye diseases is increasing. The increase of vision loss among the aging population is becoming a major public health problem (Davis, 2007; National Institute of Health/National Eye Institute [NIH/NEI], 2002; Wolfsan & Cocrane, 2000). Many Americans are facing the threat of vision loss from age-related eye diseases, and these numbers are expected to double over the next 40 years as the Baby Boomer generation ages (Rosenberg & Sperazza, 2008; Szlyk, Stelmack, Massof, Stelmack, Demers-Turco, Williams, & Wright, 2004; Massof, 2002; National Eye Institute [NIH/NEI], 2002; Wolfsan & Cochrane, 2000).

Vision loss often has a negative impact on one's ability to function effectively in their environment, especially in terms of healthy living and the ability to access or read information. Persons with vision loss face many unique challenges, especially when trying to read print in their daily activities. Vision loss occurs in all age groups; however, it is far more prevalent in the elderly (Chou, Dana, & Bougatsos, 2009; Guier, 2002). Being able to read and having access to medication information to maintain a healthy quality of life is essential. The American Foundation for the Blind (2008a) noted that there are approximately 20 million people with vision loss that have required some assistance in taking medication. Access to prescription information, such as medication type and instructions, is essential for everyone and presents a special challenge for individuals with vision loss. Many older adults take multiple prescription as well as over-the-counter medications. This adds to the challenge of these individuals who are adjusting to vision loss (Stelmack, 2001; Windham, et al., 2005).

The Food and Drug Administration (FDA) implements laws and regulations that govern drug information. However, the FDA has never issued any specific regulations to guidelines to guarantee that prescription drug information is accessible for people with vision loss (AFB, 2008a). States primarily regulate the format and content on a prescription bottle or the pharmacy-provided packaging. All states have statutory requirements regarding prescription labeling; however, no state addresses the need to ensure that individuals with visual impairment have accessible prescription labeling information (AFB, 2008a).

Osterberg and Blaschke (2005) noted the failure of individuals to follow prescribed medications. Failure to follow the prescribed medication regimen has been identified as a significant cause of illness in the older population. Non-adherence means that the medication is not being taken as prescribed; therefore, the medication is unable to work correctly to help the patient (Osterberg & Blaschke, 2005). This problem is particularly true for older adults who take medications multiple times throughout the day. In fact, failure to follow prescribed medication regimens can even result in death (Osterberg & Blaschke, 2005; Yamdagni, Bhaheetharan, Dunn & Famimi, 2007). Vision loss can be permanent loss not correctable by conventional methods (Freeman, et al., 2007; Guier, 2002). Visual impairment impacts an individual’s ability to function in every aspect of life. In fact, some vision loss can result in blindness, which is one of Americans’ most feared illnesses, ranking fourth after acquired immunodeficiency syndrome (AIDS), cancer, and Alzheimer’s disease (NIH/NEI, 2002; Rosenberg & Sperazza, 2008).

Individuals with visual impairments have unique health care and social needs. They require help and support to make informed decisions and improve their health care (Beverley, Bath, & Booth, 2004; Davis, 2009). Accessible information is not always available for individuals who require alternate methods of communication, though it is worthy of exploration (Beverley, Bath, & Booth, 2004). In fact, accessible information is imperative for people to address their health concerns in the areas of prevention, detection, and treatment (Beverley, Bath, & Booth, 2004). Rosenberg and Sperazza (2008) noted that individuals with visual impairments may not provide information to their primary care providers regarding their vision loss or its impact because their focus is on immediate medical concerns or symptoms. During these visits, individuals with visual impairments are not always aware of the connection between their primary medical conditions and the issues related to their vision loss (Rosenberg & Sperazza, 2008).

Individuals with vision impairments may not feel it is appropriate to address their visual concerns with their primary care provider. However, primary care providers can encourage these individuals to engage in discussions and specific questions regarding their visual recognition and task performance (Rosenberg & Sperazza, 2008). When individuals with vision impairment have access to more information, it increases their patient satisfaction. In addition, when individuals are provided information that is accessible and understandable to them, there is an increase in compliance in taking their medication, and recall of information is increased. There is also an enhanced awareness and understanding associated with their medical condition (Beverley, Bath, & Booth, 2004).

A significant problem in today's medical field is a failure of individuals to follow prescribed medication regimens. This is particularly true for older adults who take medications multiple times throughout the day (Yamdagni, Bhaheetharan, Dunn, & Famimi, 2007). Failure to follow the medication regimen has been identified as a significant cause of illness in the older population. Non-adherence to one's prescribed regimen means that the medication is not being taken appropriately; therefore, it is unable to work correctly (Osterberg & Blaschke, 2005). Individuals with visual impairment want to be able to participate in activities that enhance and reflect their well-being. They want to be able to perform daily life skills such as self-medication, self-care, food preparation, clothing care, time management, reading, social functions, etc. These activities enhance one's independence and perceived quality of life (Choosing Life Skills, 1998; Cimarolli, Boerner, & Wang, 2006; Levasseur, Desrosiers, & St-Cyr Tribble, 2008).

There are several important reasons to study this topic. One important reason is the increase in the number of adults who are visually impaired and the challenges they face in accessing information, especially in terms of managing their medical care and taking prescribed medications. Visual impairment is an important health care issue. It can result in an inability to read information and follow a prescribed medication regimen. This behavior can have a devastating negative impact.

Also, individuals experiencing visual impairment often experience a loss of income, and a decrease in successful financial management (Safran, et al., 2005). An added concern is these individuals also experience a loss of independence, lack of participation in activities, limited functional skills, and concerns regarding self-care (Levasseur, Desrosiers, & St-Cyr Tribble, 2008; Windham, et al., 2005). All these skills are necessary for healthy living. Individuals should be able to access information, make informed decisions, and maintain functional skills for daily living. Thus, maintaining necessary skills requires access to information and self-care. The current literature reflects that vision impairment is a major contributor to impediments and future functional decline for older adults (Breman, Horowitz, & Su, 2005; Scott, Smiddy, Schiffman, Feuer, & Pappas, 1999). In addition, the loss of vision for older adults has been shown to be a major contributor to lack of medical follow-up and depression (Burmedi, Becker, Heyl, Wahl, & Himmelsbach, 2002; Crews, & Campbell, 2001; Horowitz, 2004). Vision impairment and blindness impact health-related quality of life issues which are also associated with one's ability to function adequately in their daily living and self-care (Cimarolli, Boerner, & Wang, 2006; Margolis, et al., 2002). These challenges can represent a significant burden to the individual, their families, and caregivers (Davis, 2007; Silva-Smith, Theune, & Spaid, 2007).

Kington, Rogowski, Lillard, and Lee (1997) conducted a study using a health questionnaire of 2,429 participants to examine the relation between self-reported trouble seeing, six other symptoms, and nine general disease conditions with different measures of health status. Multivariate analyses were conducted using the symptoms and conditions in addition to the six symptom variables to determine their relative association with each of the scales. The study showed a significant adverse functional relation between self-reported "trouble seeing" and health status in the aged in the general population (general health perception for symptom of trouble seeing ($r = -8.77$). This indicates that closest to zero and negative coefficient reflected a worsening of health status for individuals with trouble seeing. The findings suggested that future instruments for assessing functional disabilities related to vision should also consider health-related questions and vice versa (Kington, Rogowski, Lillard, & Lee, 1997).

Aspinall, Johnson, Azuanra-Blanco, Maontarzino, Brice and Vickers (2008) noted that quality of life for individuals with some form of vision impairment (such as glaucoma) is reduced with the severity of the vision loss. The impact of quality of life for individuals with vision loss influences the significance given to the individual's ability to perform various tasks. Fletcher, Schuchard, Walker, and Raskauskas (2008) noted that individuals with visual impairment such as macular degeneration also had much difficulty maintaining their activities of daily living as well as their ability to live independently. The American Foundation for the Blind (AFB, 2005) noted that following a prescribed medical regimen can enhance one's quality of life. According to a recent study by the Foundation, individuals with vision loss were unable to read their prescribed medications. In fact, some took improper doses of their medications and in some cases became ill and received treatment in the emergency room (AFB, 2009).

When issues relating to lack of access to medication or lack of ability to read printed information to take medication exist, it impacts the individual's health-related quality of life. McMahon and Curtis (2009) conducted a study of 283 respondents who were visually impaired and two-thirds (77%) were older than age 75. They represented the Northeastern United States and received services from a blind rehabilitation agency. The researchers used SPSS software to conduct the standard descriptive statistical analysis. The survey tool contained two questions about the methods that respondents used to read prescription medication labels (McMahon & Curtis, 2009). The study explored how often and using what methods persons who are visually impaired accessed their medication levels or were independently able to read the labels on their prescription medications. Findings indicate that 46% of respondents had someone else to read their label or used some form of magnification such as hand-held magnifier (26%), video magnifier (12%), or reading glasses (8%). Others selected some other methods (5%), such as remembering the instructions provided by the physician, having medication arranged in a weekly pill dispenser, or having medication dispensed by someone else (McMahon & Curtis, 2009).

Latham, Waller, and Schaitel (2011) designed a study to examine the accessibility of medication labels for individuals with visual impairment. The study consisted of 20 subjects with normal vision. Visual impairment was produced using simulators designed by the University of Cambridge Engineering Design. For the accurate reading of three label types under three visual conditions, the influence of label design on reading in words per minute correctly was highly significant (F 1.9, 36.5 = 32.8, $p < 0.0001$), as was the influence of vision (F 1.5, 29.1 = 266, $p < 0.0001$), and the interaction between label design and vision (F 2.4, 45.8 = 9.9, $p < 0.0001$), all repeated measures ANOVA. With moderate visual impairment, reading was slow (<25 wpm correct) with all label designs. The results reflected that both visual acuity and contrast sensitivity were reduced by the use of simulators (Latham, Waller, & Schaitel, 2011).

Kelly (2008) also conducted an Access to Drug Labels Survey to explore the difficulty individuals were having reading their prescription medication labels or over-the-counter medication information. Approximately 100 respondents voluntarily completed the online questionnaire that consisted of four open-ended questions. Respondents included people of all ages with vision loss who may also have other disabilities and family members who also have vision loss (Kelly, 2008). Data indicated that the inability to access necessary instructions supplied with prescriptions and over-the-counter medications often resulted in people with vision loss not taking a proper dose of necessary medication. All respondents (N=100) explained that they were dependent either on trusted sighted companions or complete strangers to convey necessary drug information (Kelly, 2008).

Moisan, Gaudet, Gregoire, and Bouchard (2002) conducted a study to explore the understanding of prescription labels and reading difficulties. There were 325 participants from six different ambulatory care centers who participated in the study. An instrument that included four survey questions was developed to measure non-compliance. All data were collected anonymously. Descriptive analysis was used to establish the proportion of participants experiencing problems reading and the proportion of the same individuals having difficulties understanding the information on the prescription labels (Moisan, Gaudet, Gregoire, & Bouchard, 2002). The results reflect that 67.1% did not fully understand all the information, 90% of the subjects who had problems reading the labels did not manage to understand all information, 47.1% were non-compliant respondents, and 40% of subjects were not successful in reading all the labels, while more than two-thirds were unable to fully understand them (Moisan, Gaudet, Gregoire, & Bouchard, 2002).

Zagar and Baggarly (2010) in their study on medication-related difficulties used simulated activities. There were 20 subjects (second year [P2] and third year [P3] students). Subjects wore welder's goggles with lenses that were altered to simulate low-vision conditions such as glaucoma, cataract, macular degeneration, diabetic retinopathy, and retinitis pigmentosa. The sample included 100% of the students in the class; all participated in the survey. The results reflected that the greatest medication management difficulty was with visual impairments associated with macular degeneration; the least was visual impairments associated with glaucoma (Zagar & Baggarly, 2010).

Shrank, Avorn, Roton, and Shekelle (2007) focused on physician-patient communication about medications and the content and format of prescription drug labels. A systematic review of randomized controlled trials, observational studies, and systematic reviews were conducted from the literature. Of the 2,009 articles screened, 36 addressed the content of physician-patient communication about medications, and 69 that were related to the content or format of medication labels met review criteria. The results showed that patients requested drug information, expected benefits, duration of therapy, and a thorough list of potential adverse effects. Evidence about label format supports the use of larger fonts, lists, headers, and white space to enhance contrast, using simple language, and logical organization to improve readability and comprehension. Evidence also suggests that specific content and format of prescription drug labels facilitate communication with and comprehension by patients (Shrank, Avorn, Roton, & Shekelle, 2007).

Drummond, Drummond, and Dutton (2004) conducted a study where the participants in the group were randomly selected. Thirty patients were recruited for each of the six levels of best corrected visual acuity (VA), recruiting 180 subjects in total, the Kruskal-Wallis test was used with Dunn's test to compare each group. A p value of < 0.05 was considered significant. Subjects were asked to read the instructions on the side of the box of drops without magnification. Results show that there was a decline in near visual acuity, with decline in distance visual acuity using both the near test and the Snellen Chart when comparing the ability to read the instructions on the medication with distance for visual acuity. There was a significant difference between the subgroup of patients with the best distance visual acuity (VA) of 6/18. Most were able to read the instructions and the subgroup with the best distance of 6/24 who were unable to read the instructions (Drummond, Drummond, & Dutton, 2004). When these groups were able to select the font size of their choice, the mode for preferred Arial font sizes was 16 for the 6/24 group, 18 for the 6/36 group and 22 for the 6/60 group. This study was able to document the inability of subjects with visual impairment to read the instructions on their bottle of eye drops. Even though there is a 6/18 threshold for most individuals to read instructions; however, for those with poorer vision (visual acuity), it was more difficult to read the instructions. This study suggests that font size is an important factor in being able to read the instructions (Drummond, Drummond, & Dutton, 2004).

Shrank, Choudhry, and Kesselheim (2007) also conducted a study exploring the prescription labeling design for four commonly used medications. The prescription labeling results were assessed by pharmacy of origin, warnings, and other informational stickers. The label information was observed less often in independent pharmacies than in chain or grocery store pharmacies. There was a substantial variation in the font size of different items on the label. Use of color, bold face, and highlights on the label also showed variation. The most common bold face was the pharmacy name. The content of the warning and other special instructions on the label also varied considerably. In 82% of the bottles, warning stickers were not oriented in the same direction as the main container information. Prescriptions filled in larger bottles received significantly more labeling than those filled in smaller bottles. A small amount of the variance was explained by this association between bottle size and the amount of labeling (Pearson correlation coefficient = 0.36, $P < .01$) (Shrank, Choudhry, & Kesselheim 2007).

Shrank, et al. (2009) conducted a study to explore medication adherence. A new prescription medication labeling system was implemented by Target Pharmacies. A pre-post evaluation compared chronic medication adherence using pharmacy claims from two large commercial insurance plans. Those who used the Target Pharmacy were exposed to the new label; those who used Non-Target Pharmacies were not exposed. The sample included 23,745 Target users and 162,368 Non-Target users. Linear regression and segmented linear regression were used to evaluate the new-user (Target) and prevalent-user (Non-Target). For Target users there was a 0.0007 percent increase in the slope (the monthly rate of adherence) and implementation of the new label (95% C1 0.001, – 0.0013, $p = 0.001$) (Shrank, et al., 2009).

The researcher noted that the label would be more likely to enhance medication safety than adherence. Some of the new features of the label such as colored rings helped patients identify which medication to take that was important for them. The results also focused on improving safety and had little effect on the quantity of medication purchased (Shrank, et al., 2009).

Feely, Vetere, and Myers (2007) conducted a study with seven participants with visual impairment (bilateral age-related macular degeneration [AMD]) and no other ocular disability. They were recruited through the low vision clinic. The study examined the reading rehabilitation of persons with visual impairment (age-related macular degeneration). All participants received one hour of instruction in eccentric viewing and page navigation with their magnifier using a method called “steady eye” where the text was optionally enlarged over their own preferred retinal loci. The results from the study revealed that participants were overcoming reading difficulties using eccentric viewing. It required persons to be highly motivated and the instructor to be skilled in conveying how they should find their preferred retinal loci. Participants reported feeling “only half a person,” which indicated giving up tasks and hobbies (such as reading) because they proved too difficult, or led to frustration, irritation, and boredom. Two out of the four participants reported that they would never read properly again and stated that their reading was no longer enjoyable (Feely, Vetere, & Myers, 2007).

Popivker, Wang, and Boerner (2009) conducted a study using the Functional Loss Scale, a 15-item index, to assess whether or not difficulty was experienced in specific functional areas (e.g. reading, newspaper print, recognizing faces). Participants (N = 216) for this study were recruited from a pool of middle-aged adults (40–64) with visual impairment who had been first-time applicants at a vision rehabilitation agency. The results reflected that functional goals were nearly always vision-related daily tasks (reading regular print, labels, and prices), mobility and independence. Across these three important goals, the majority of participants (N=168) reported at least one vision-related goal (146 participants reported at least two vision-related goals).

Overall, the functional domain included more task-oriented vision-related goals, such as reading, walking outdoors, working and being independent. To conclude, visual disability in adulthood is a great barrier to achieving goals that individuals typically want and need to accomplish at this point in their life (Popivker, Wang, & Boerner, 2009).

Laitinen, et al. (2008) conducted a study examining the need for assistance when visually impaired. This study consisted of a health and rehabilitation interview that included questions on vision and rehabilitation services. The sample population (147 people) was visually impaired (VA ≤ 0.25 [20/80]). The need for assistance was analyzed among people with visual impairment living in the community (N = 120). Of these, 71% reported the need for assistance, and 24% of those said they did not receive enough assistance for everyday living. Of people with moderate low vision, 4% to 36% needed assistance in activities of daily living (ADL) tasks and 32% to 57% in instrumental activities of daily living (IADL) tasks. The corresponding proportions were higher in people with severe low vision, from 18% to 51% in ADL tasks and from 64% to 80% in IADL tasks (Laitinen, et al., 2008)

Scott, Smiddy, Schiffman, Feuer, and Pappas (1999) noted in their study that vision loss among the older population is expected to double by 2030 and those individuals needing assistance in activities of daily functioning is expected to increase. Scott, Smiddy, Schiffman, Feuer, and Pappas (1999) examined the quality of life among individuals with vision loss. They used the National Eye Institute Visual Functioning Questionnaire (NEI-VFQ). This instrument is sensitive to measuring individuals' decreased functional status which is secondary to their vision loss (Scott, Smiddy, Feuer, & Pappas, 1999; Stelmack, 2001). NEI-VFQ was administered to 156 clients in a low vision clinic during pre- and post-visit. The NEI-VFQ was developed to measure the impact of visual disability on health-related quality of life issues on various subscales. The NEI-VFQ consisted of the following subscales: general health, general vision, visual pain, near activities, distance activities, vision-specific mental health, vision-specific expectations, vision-specific role difficulties, vision-specific dependency, driving, color vision, and peripheral vision (Scott, Smiddy, Schiffman, Feuer & Pappas, 1999).

In this study, paired-samples t-tests were used to review differences between questionnaire scores before and after respondents visited the low vision clinic (Scott, Smiddy, Schiffman, Feuer & Pappas, 1999). Paired-samples t-tests were also used to compare the scores of this study with published scores (means and standard errors) of other populations. The NEI-VFQ subscales reflected a statistically significant improvement after receiving low vision services. The scores reflected general vision (42.8 to 46.1, P = .001), near activities (38.0 to 46.3, P = .001), distance activities (38.3 to 41.1, P = .001), and peripheral vision (37.9 to 42.6, P = .001). The findings from the study indicated that respondents with visual impairments perceived that, as a result of the low vision services, there was some improvement in their visual functioning. In addition, they also perceived that their functional status and quality of life was improved (Scott, Smiddy, Schiffman, Feuer & Pappas, 1999).

Rosenberg and Sperazza (2008) noted that individuals with vision loss are more likely to have problems in their daily lives that include social isolation, depression, falls, and medication error, to name only a few. Rosenberg and Sperazza (2008) also noted that rehabilitation helps individuals with vision loss maintain their independence, reduces their need for social services and institutionalization; in addition, rehabilitation helps individuals to maintain jobs and remain active members in society (Rosenberg & Sperazza, 2008).

A study conducted by McKean-Cowdin, Varma, Wu, Hays, and Azen (2007) examined visual impairment and self-reported health-related quality of life in a cross-sectional population of 5,213 participants in a Los Angeles Eye Clinic. The National Eye Institute-Visual Functioning Questionnaire (NEI-VFQ-25) was used. Data were analyzed using linear regression analyses and analysis of covariance to assess the relationship between health-related quality of life and visual field loss (McKean-Cowdin, Varma, Wu, Hays, & Azen, 2007). The study findings indicated that the largest beta coefficients and differences in the NEI-VFQ-25 vision-targeted subscales were present for driving difficulties, vision specific dependency, and vision-specific mental health. As a result, this reflects that visual field loss or impairment has a substantial impact on the individual's ability to function independently, which has a significant impact on one's quality of life, functional skills, and health status (Mckean-Cowdin, Varma, Wu, Hays, & Azen, 2007). The findings also reflected that persons with diminished vision or visual loss had greater difficulty with functional skills such as driving activities, dependency, distance vision skills, near vision skills, mental health, and skills that require peripheral vision. As a result, individuals with visual impairment may also experience some level of diminished health-related quality of life (Mckean-Cowdin, Varma, Wu, Hays & Azen, 2007).

Levasseur, Desrosiers, and St-Cyr Tribble (2008) reported findings in their study that examined quality of life, participation (level and satisfaction), and perceived quality of the environment (elements in the physical or social environment) of older adults. The results reflected that there were differences in quality of life based on level of activity. The participants included 156 older adults residing at home with fairly good cognitive skills. There were three instruments used: Quality of Life Index (quality of life estimates), Assessment of Life Skills (participation in activities), and the Measurement of the Quality of the Environment (environment measure). The Analysis of Variance (ANOVA) or Welch F ratio indicated that variables differed according to the activity level (Levasseur, Desrosiers, & St Cyr-Tribble, 2008).

The findings suggested that the greater the participation, the higher the activity level score ($P < 0.001$). Results revealed that older adults' quality of life and satisfaction with participation were greater with a higher involvement in their activity level ($P < 0.001$). This would also support the notion of taking an active participation in one's own care. Visual impairment can negatively impact one's perception of their quality of life (Evans, Law, Walt, Buchholz, & Hansen, 2009; Guier, 2002; Levasseur, Desrosiers, & St Cyr-Tribble, 2008). In addition, individuals who are visually impaired or who have vision loss produced a greater financial burden on health care agencies and society in general (Davis, 2007; Evan, Law, Walt, Buchholz, & Hansen, 2009; Guier, 2002).

Visual impairment also impacts individuals as well as society financially. Safran, et al. (2005) conducted a national survey of senior's community-dwellings, of elderly Medicare beneficiaries with prescription regimens. The sample included 36,901 non-institutionalized Medicare beneficiaries ages 65 and older, randomly sampled from each state and the District of Columbia. Researchers received a response rate of 51 percent. This was before the new Medicare prescription drug benefit in 2003. Slightly more than one-quarter (26%) of the seniors reported that they did not fill prescriptions in the past year because of cost, or that they skipped or cut back on medication to make the prescription last longer (Safran, et al., 2005). The results reflect the following: 90% of elderly adults (ages 65 and older) take prescription drugs, and they take about five prescription drugs on average. Seniors face financial challenges paying for drugs, which result in them skipping doses or not taking their medication. Cost related to non-adherence was even higher among individuals without prescription drug coverage (37%), low-income seniors (35%), and those with complex chronic illness (35%). The study also found that inadequate access and adherence to essential prescription drugs can lead to adverse health outcomes, increased use of the emergency room, admission to nursing homes or for hospitalization (Safran, et al., 2005).

Longelaan, Boer, Nispen, Wouters, and Mall (2009) conducted a study using the NEI-VFQ-25. The data were collected on 129 adults with vision impairment drawn initially from baseline and after completion of a rehabilitation program. Data analyzed used the means of random coefficient analyses for the change between subsequent measurements of the four dependent variables and the longitudinal relationship between vision-related quality of life and the prediction factors. Findings reflect that mental health and dependence scores showed significant improvement after rehabilitation, which enhanced functional skills and changed one's perception of their quality of life. The authors noted that age appeared to be a significant variable for all factors relative to the NEI-VFQ scale (Langelaan, Boer, Nispen, Wouters, & Mall, 2009).

Stelmack, et al. (2006) noted that when using a questionnaire such as the Visual Functioning Questionnaire (VFQ) to obtain information, timing regarding the collection of data is significant for individuals with vision impairment. Perceptions before and after receiving training on low vision devices can impact results. When surveying the services, provided (or provider) timing is very significant when attempting to address quality of life issues.

The Adherence to Refills and Medications Scale (ARMS) is designed to evaluate medication adherence for populations with chronic conditions. The ARMS is among the earliest instruments to measure adherence that demonstrates stability across levels of patient literacy. Kripalani, Risser, Gatti, and Jacobson (2009) noted that over 90 million people are affected with limited literacy in the United States. Understanding drug regimens as well as the side effects is a process that is associated with one's literacy. Individuals with limited literacy have a greater challenge in being able to identify their own medications as well as distinguish medications from each other. They misinterpret prescription drug labels, auxiliary warning labels and have poor adherence to medications associated with refilling one's medication. Having limited literacy appears to be a common problem (Kripalani, Risser, Gatti, & Jacobson, 2009).

Kalichman, Ramachandran, and Catz (1999) noted that limited literacy had a negative impact on adherence to medications. However, Gazmararian, et al. (2006) noted that inadequate literacy was significantly associated with poor medication refill adherence in unadjusted analyses. In the fully adjusted models the results showed that there was a strong trend but without a statistically significant effect (Gazmararian, et al., 2006).

The Adherence to Refills and Medication Scale (ARMS) is designed to include two distinct subscales supported by the overall factor analysis. The 8-item medication taking subscale assesses a patient's ability to self-administer the prescribed regimen correctly. The four-item prescription refill subscale assesses a patient's ability to refill medications. The combined 12-item scale is a 4-point Likert-type scale with a composite score range of 12 to 48 points (Kripalani, Risser, Gatti, & Jacobson, 2009). Cronbach's alpha for the full scale is high ($\alpha = 0.82$). The ARMS demonstrated high internal consistency and high correlation with older standardized measures. Patients with low ARMS scores indicate better adherence to medication. ARMS has a valid and reliable self-reported medication measure on adherence which performs well across literacy levels (Kripalani, Risser, Gatti, & Jacobson, 2009). The Self-Efficacy for Appropriate Medication Use Scale (SEAMS) is a valid self-reported scale. It is a 13-question instrument to assess barriers and self-efficacy (Lousa, Holzworth, & Ansani, 2011). The SEAMS measures confidence in one's ability to self-administer medication properly. This instrument has a high internal consistency and strong criterion-related validity (Risser, Jacobson,

& Kripalani, 2007). The instrument is scored on a 3-point Likert-type scale with a possible range of 3 to 39 points. Higher scores on the SEAMS indicate better self-efficacy. Analysis of pretest scores revealed high reliability (Cronbach's α = .91) (Risser, Jacobson, & Kripalani, 2007).

Terminology

When reporting demographic information concerning the population with vision loss, there are varying definitions and different measuring criteria used by surveyors to collect data to categorize people with vision loss (Kelly, 2009). Therefore, the terminology used and the information acquired may vary depending on the methods used (Kelly, 2009). It has been noted that there are several terms used to describe people with vision loss such as total blindness, legal blindness, low vision, visual impairment, functional limitation to seeing and severe limitation in seeing (Kelly, 2009).

Associated with the terms are various levels or degrees of vision loss. When defining terms or collecting data, there is no one source that defines and provides data that represents everyone experiencing vision loss in the United States (Kelly, 2009). In essence, there are several definitions associated with vision loss and it is imperative that researchers and participants recognize the many definitions when collecting data (Kelly, 2009).

Visual Impairment

Regardless of whether the individual is noted as being visually impaired, having low vision, or being legally blind, there is an associated functional limitation that reflects a significant interruption in an individual's ability to function independently. Individuals with vision impairment are defined as having 20/40 or worse vision in the better eye, even when they are wearing eyeglasses (American Foundation for the Blind, 2002; Friedman, Congdon, Kempen, & Tieisch, 2002; Friedman, et al., 2008; NIH/NEI, 2004; Prevent Blindness America, 2002). Vision impairment or low vision means that even with various interventions and/or treatments such as eye glasses, contact lenses, medicine or surgery, the individual is unable to see well (Choosing Life Skills, 1998; Friedman, Congdon, Kempen, & Tieisch, 2002; NIH/NEI, 2002). As a result of the vision loss, one must change how they adapt to situations and reorganize their life and learn new ways of doing things (Choosing Life Skills, 1998; Venkatesh, 2012).

The term visual impairment includes various ranges of vision loss. Visual impairment can be used to describe nearly any type of vision loss. An individual with vision loss can range from someone who is able to see partially, to someone who cannot see at all (Friedman, Congdon, Kempen, & Tieisch, 2002; Lehman & Ben-Joseph, 2007). The International Classification of Diseases, 9th Revision (ICD-9-CM) Classifications describes various levels and ranges of visual impairments (Carthwaite & Garner, 2002). Visual impairment is associated with the functioning of the eye and tests are used to measure various levels of acuity, visual fields, contrast sensitivity and color vision (Carthwaite & Garner, 2002). The World Health Organization (WHO) International Classification of Impairment, Disabilities, and Handicaps is a system that is used to classify various diseases, impairments, disabilities, and handicaps (World Health Organization, International Classification of Functioning, Disability and Health [WHO/ICF], 2001). It indicates that a visual impairment is a result of a loss or an abnormality that exists in one’s physiological or psychological functioning (WHO [ICF], 2001). As a result, it may include a functional limitation for an individual in various aspects of their existence and/or ability to function in settings such as work, school, home, and leisure (Hays, Kraft, & Stolov, 1994; Massof & Lidoff, 2001; Riviere, 1996). Intervention may address various types of impairments, utilize several approaches, and identify appropriate accommodations that will enhance the individual's performance (Hays, Kraft, & Stolov, 1994; Riviere, 1996).

Here, the eye(s) or visual system has a functional limitation due to a disease or disorder that results in a visual impairment (WHO/ICF, 2001). Visual impairment is classified based on different visual levels associated with one's visual acuity and/ or visual field limitation (WHO/ICF, 2001). However, the National Eye Institute also has established its definition for visual impairment. The National Eye Institute has described visual impairment as a condition of the eye that is not corrected by standard eyeglasses, contact lenses, medication or surgery. In addition, this condition of the eye interferes with the individual's ability to perform activities of daily living (NIH/NEI, 2006). The ICD-9-CM classification of visual impairment is used to associate a diagnosis with a code for visual impairment. This classification system specifies all levels of vision loss that take place with each eye (Freeman, Goodrich & Stelmack, 2007).

Prevalence of Visual Impairment and Blindness in the Population

Worldwide, there are about 314 million people who are visually impaired. Of that number, 45 million are considered blind. Millions of Americans lose some of their vision for different reasons and circumstances each year (NIH/NEI, 2007; WHO, 2009). In addition, as Americans age, a higher prevalence of sensory impairments is identified as reflected by the National Health Interview survey data (Davila, et al., 2009). However, at all ages women are at greater risk for vision impairment in every part of the world (WHO, 2009). The causes of vision impairment and blindness may also vary by race and ethnicity (Congdon, et al., 2004; NIH/NEI, 2002).

The number of Americans over the age of 65 will more than double over the next 25 years, from 35 million in 2000 to 72 million in 2030 (Coogan, 2004; Freeman, et al., 2007; U.S.

Department of Commerce, 2005). Eight percent of the population consists of people 80 years of age and older. This population also accounts for 69 percent of those individuals experiencing blindness in the United States (Coogan, 2004).

Many of the disorders that cause vision impairment are found in the aging population (Greig, West & Overbury, 1986; Massoff, 2002; NIH/NEI, 2002; U.S. Department of Commerce, Economics and Statistics Administration, 2005). Estimates of the number of people that experience vision loss differ based on various factors such as definition of visual impairment, the population surveyed, whether self-reported or verified by screening or examination, dates in which those data were collected, and other elements associated with data collection (Freeman, et al., 2007).

Prevent Blindness America and the National Eye Institute reported that millions of Americans live with some type of age-related vision loss (Review of Ophthalmology, 2008). The NEI study on “Vision Problems in the U.S.,” reported that there are between 1.5 and 3.4 million American adults 40 years and older in the U.S. with visual impairment. This is an underestimation of the actual prevalence of visual impairment because it is based on visual acuity alone (Freeman, et al., 2007; Massof, 2002; Review of Ophthalmology, 2008; The Eye Disease Prevalence and Incidence Research Group, 2004).

In the United States, there are millions of Americans who have partial or complete loss of vision (Torphy, Cassio & Glass, 2003). There are several types of eye problems and visual disturbance that result in changes in the eye (Ray, Horvat, Williams & Blasch, 2007; Zieve, Juhn, & Eltz, 2008). Vision problems in the U.S. indicated that the leading cause of vision impairment and blindness for Americans age 40 and older were age-related macular degeneration, glaucoma, cataract and diabetic retinopathy (Coogan, 2004; Garrett, 2002;

Tolman, Hill, Kleinschmidt, & Gregg, 2005; Torpy, Lynn & Glass, 2003; Zieve, Juhn, & Eltz; 2008).

Blindness affects nearly 1 million individuals over age 40; blindness or low vision affects 1 in 28 Americans older than 40 years of age. The causes of vision impairment and blindness vary by race and ethnicity (Congdon, et al., 2004; NIH/NEI, 2002). The National Institutes of Health, National Eye Institute (2002) report the following exist as the major causes of vision loss:

- Age-related macular degeneration (ARMD) has been identified as the most common cause of vision impairment in Americans age 50 and older with over 1.6 million Americans experiencing ARMD (NIH/NEI, 2004; Prevent Blindness America, 2002; Smith, Thomas, & Dow, 2009; The Eye Disease Prevalence and Research Group, 2004). During the early years, prevalence rates are comparable among races; however, after age 75 they advance more significantly for Whites. The disease is more prevalent in Black women until the age of 75 (NIH\NEI, 2004; Prevent Blindness America, 2002).
- Glaucoma is a chronic disease that requires life-long treatment. There are nearly 2.2 million Americans diagnosed with glaucoma age 40 and older, or about 1.9% of the population. Another 2 million are not aware that they have this condition (Coogan, 2004; Garrett, 2002; NIH/NEI, 2004; Prevent Blindness America, 2002). The prevalence of glaucoma is related to age and race. Glaucoma appears more commonly in Hispanics and Blacks, and it increases with age. For those aged 65–74, the prevalence for White females is 1.6% and the rate is three times higher for Black females. Glaucoma undeniably affects those aged 80 and older with more than 10%

in Hispanic women and Black men. In fact, glaucoma appears more common initially in women; however, by age 65, prevalence is more comparable between the sexes (NIH/NEI, 2004; Prevent Blindness America, 2002; The Eye Disease Prevalence Group, 2004).

- Cataract is the leading cause of blindness in the world. There are 20.5 million Americans aged 40 and older with cataracts. More than half of all Americans have cataracts by age 80, or about one in every six individuals in this age group. Cataract is slightly more common in women than in men. With the increase in age, cataracts appear to affect Whites more frequently than any other race (Coogan, 2004; Garrett, 2002; NIH/NEI, 2004; Prevent Blindness America, 2002; The Eye Disease Prevalence and Research Group, 2004).
- Diabetic retinopathy leads in causing blindness in the industrialized world. Diabetic retinopathy increases in individuals who are between the ages of 25 and 74. For Americans that are 18 and over, diabetic retinopathy affects more than 5.3 million in the population or just 2.5% of the population (Coogan, 2004; Garrett, 2002; NIH/NEI, 2004; Prevent Blindness America, 2002; The Eye Disease Prevalence and Research Group, 2004). Prior to age 40, diabetic retinopathy affects Whites more frequently than other races. Hispanics are also significantly affected by the disease (NIH/NEI, 2004; Prevent Blindness America, 2002).

The prevalence of vision loss and blindness will increase significantly by 2030, mainly due to the population aging (Freeman, et al., 2007; NIH/NEI, 2004). Dr. E. Zerhowni, M.D., Director of the National Institutes of Health, stated that “As our population lives longer, the increase in eye diseases and treatment will be an even greater challenge and a concern for vision research, that will prevent, delay and possibly cure eye diseases" (NIH/NEI, 2004).

The Major Causes of Visual Impairment in the U.S. Population

Age-Related Macular Degeneration

Age-related macular degeneration (ARMD) is a loss of central vision, blurred vision, distorted vision, and eye colors will appear faded. For individuals over age 60 this is the most common cause of visual impairment which ranks third globally, and is irreversible (Tolman, Hill, Kleinschmidt, & Gregg, 2005; Zieve, Juhn, & Eltz, 2008). Individuals with ARMD have greater challenges completing daily tasks than people with other types of visual impairment (Wong, Guymer, Hassell, & Keeffe, 2004).

ARMD rises dramatically in Whites over the age of 80. ARMD is the leading cause of visual impairment in the Caucasian population. It reflects 54 percent of all visual impairment; in essence, more than one in ten White Americans over age 80 have vision loss due to ARMD (Coogan, 2004). Exudative ARMD is associated with severe loss of vision, and there are approximately 200,000 new cases annually in the United States (Kaufman, 2009). Kaufman (2009) noted that vision loss can significantly reduce one's quality of life. As a result, public health issues on this topic are increasingly important as this population continues to rise. Also, there is a substantial impact on the individual's quality of life and it is associated with increased levels of disability (Wong, Guymer, Hassell, & Keeffe, 2004).

ARMD is a gradual and progressive condition, that causes deterioration in the macular, a very sensitive area of the retina (Ben-Joseph & Lehman, 2007; Carthwaite & Garner, 2002; Feely, Vetere & Myers, 2007; Tolman, Hill, Kleinschmidt & Gregg, 2005; Zieve, Juhn, & Eltz, 2008). Functional visual skills are affected by ARMD. Macular degeneration negatively impacts the individual’s ability to read fine print or small lettering. It also impacts the individual’s ability to see objects. It may cause one to see wavy lines, and it also impacts one’s ability to distinguish colors. Colors often appear faded (Ben-Joseph & Lehman, 2007; Casten & Rovner, 2008; Tolman, Hill, Kleinschmidt, & Gregg, 2005; Wong, Guymer, Hassell, & Keeffe, 2004).

There are many functional visual concerns associated with individuals diagnosed with macular degeneration. They include a decreased ability to recognize faces of family members, close associates, or friends. There are problems associated with check writing, managing finances, and paying bills (Carthwaite & Garner, 2002; Casten & Rovner, 2008; Mitchell & Bradley, 2006; Tolman, Hill, Kleinschmidt, & Gregg, 2005).

Everyday functional skills are also a concern, such as safety issues associated with cooking because of an inability to see the knobs on the stove, as well as determining when food is done. The individual also has challenges participating in hobbies and activities that they enjoyed before the vision loss. There is also increased difficulty in watching television (Ben-Joseph & Lehman, 2007; Carthwaite & Garner, 2002; Fletcher, Schuchard, Walker, & Raskauskas, 2008; Mitchell & Bradley, 2006; Wong, Guymer, Hassell, & Keeffe, 2004; Zieve, Juhn, & Eltz, 2008).

Routine activities of daily living are typically affected by one’s loss of central vision. Individuals with ARMD who experience significant vision loss may be unable to move around in their familiar environments and avoid large objects (Tolman, Hill, Kleinschmidt, & Gregg, 2005). However, one element that has benefitted individuals with macular degeneration is to take each task, break it down into smaller processes, and allow more time to complete the task (Carthwaite & Garner, 2002; Feely, Vetere, & Myers, 2007).

Vision loss from ARMD significantly lowers one’s quality of life. ARMD may have a greater impact than other chronic diseases such as pulmonary diseases (Casten & Rovner, 2008; Mitchell & Bradley, 2006). For individuals with macular degeneration, severe deficits in one’s visual functioning can be exacerbated by the aging process. Quality of vision, decreased judgment in depth perception, accommodation, and problems in adapting to changes in various light conditions may be experienced (Tolman, Hill, Kleinschmidt, & Gregg, 2005).

Cataracts

A cataract is a clouding of the naturally-clear lens of the eye. When an individual has cataracts, he or she may experience progressively blurred vision. Often the individual’s near vision is better than his or her distance vision (Clinton, 1993; Kalina, 1997; Meadows, 2002). Individuals may experience reduced night vision, problems with glare, impaired depth perception, color distortion, and frequent prescription changes for eyeglasses (Clinton, 1993; Kalina, 1997; Meadows, 2002).

Cataracts are neither a growth nor a type of foreign substance. Cataracts are a loss of transparency due to protein aggregation. Cataracts are areas in the eyes that distort light when passing through the lens of the eye (opacities) (Clinton, 1993; Kalina, 1997). Cataracts may form very slowly and there is no pain associated with them. Age-related cataracts are the most common type and usually occur in both eyes (Kalina, 1997; Meadows, 2002).

Factors such as diabetes mellitus, drugs, trauma, and other ocular disorders can influence the onset of cataracts. Currently, there are no documented dietary or medical measures that will prevent or delay cataract formation (Jose, 1983; Kalina, 1997; Meadows, 2002; NIH/NEI, 2002; Prevent Blindness America, 2002). There are some significant factors that might contribute to cataracts such as advanced aging, diabetes, smoking and high exposure to sunlight (Prevent

Blindness America, 2002). Cataracts appear to have no attributable cause other than aging (Kalina, 1997).

Cataracts are considered the leading cause of blindness in the world (Clinton, 1993). They are the leading cause of vision impairment among all Americans, causing 50 percent of all cases. Among African Americans, cataracts are one of the leading causes of blindness (Coogan, 2004; Prevent Blindness America, 2002). Individuals with cataracts may experience a loss or diminished ability to perform many of their common daily living tasks. The functional limitations experienced in their daily activities are associated with the visual impairments that exist (Kalina, 1997; Stelmack, 2001). In many cases, surgical treatment can eliminate vision loss due to the disease.

Functional impediments that may be linked to diminished vision or even the loss of vision include one's ability to perform such routine activities as preparing meals, doing housework, bathing, eating, dressing, using the toilet, doing laundry, walking, shopping, taking medication, getting around outside, managing money, using the telephone, driving and using other transportation. In addition, other functional limitations may include a lack of participation in hobbies or leisure activities such as reading or watching television. Cataracts also can impact the individual's ability to work based on the associated functional limitations (Clinton, 1993; Kalina, 1997). In addition, individuals diagnosed with cataracts may experience a loss of independence, self-esteem, and deterioration of social and emotional well-being (Clinton, 1993; McGwin, Li, McNeal, & Owsley, 2003).

Diabetic Retinopathy

Diabetic retinopathy is a common complication of diabetes and can affect anyone with diabetes. Diabetes has become a serious health problem nationwide (NIH/NEI, 2004; Ponchilla, 2006; Prevent Blindness America, 2002; Saaddine, et al., 1999). More U.S. adults with diabetes fear vision loss or blindness than they fear dying prematurely (Brown, 1999). Not only elderly persons but also many children are being challenged by the threat of diabetes in their lives. Nearly seven in ten (69 percent) U.S. adults with diabetes were aware that vision loss or blindness is a potential complication associated with diabetes (NIH/NEI, 2004; Prevent Blindness America, 2002).

The leading causes of visual impairment and blindness are diabetic retinopathy and age-related eye diseases. An estimated 3.4 million U.S. adults aged 40 and older have some form of visual impairment and blindness. Diabetes affects approximately 18 million U.S. adults, and an estimated 30% have undiagnosed diabetes, which poses an increased risk for eye disease (Brown, 1999; Ponchilla, 2006).

Diabetes is the leading cause of blindness in working adults in the U.S. Many U.S. adults with diabetes report that they have not experienced vision loss or blindness. However, this group reports that they are worried about losing the ability to conduct certain daily life activities, such as driving (65 percent), reading (61 percent) and continuing hobbies or interests (43 percent) (Brown, 2006**;** Stochura, 1993). As a result, individuals with vision loss or blindness also reports that they experience feelings of frustration (44 percent), depression (34 percent), and loss of independence (34 percent) because of their vision loss (Brown, 1999; Stochura, 1993).

By the time many symptoms of diabetes are noticed, blood glucose levels can be dangerously high (Knobbe & Haddrill, 2008; Sugunendran, 2011). Excess glucose in small blood vessels can lead to damage to the corneas, blood vessels, nerves, body extremities such as hands and feet, and loss of vision. High glucose levels can harm the light-sensitive layer at the back of the eye known as the retina (Knobbe & Haddrill, 2008). The tiny blood vessels at the back of the eye can become progressively damaged and unable to transport blood properly. This damage can lead to lasting difficulties and blindness if it is not treated. This condition is known as diabetic retinopathy. However, a significant number of individuals initially diagnosed with diabetes already have some degree of retinopathy. There are typically no symptoms for diabetic retinopathy until the damage has progressed to a point where major complications are obvious (Brown, 2006; Knobbe & Haddrill, 2008; Sugunendran, 2011).

Annual dilated eye exams allow physicians to catch early signs of eye damage and helps prevent further damage (Brown, 1999; Stochura, 1993). It is vital that people with diabetic retinopathy be armed with the knowledge they need to stop the progression of the disease. For patients diagnosed with diabetes, good communication enhances prevention with the support of a healthcare team. It is important to control the disease to prevent severe damage to the individual (Brown, 1999). The longer the individual has diabetes the greater the risk of developing diabetic retinopathy (Castor & Carter, 1995; Knobbe & Haddrill, 2008). Individuals who develop diabetes later in life are also at risk of developing advanced diabetic retinopathy. Individuals with diabetes for 15 years or more years are likely to have some diabetic retinopathy (Castor & Carter, 1995; Prevent Blindness America, 2002).

Individuals with diabetic retinopathy experience numerous functional impairments because of their vision loss. They experience a loss of visual acuity as well as visual field loss (Carthwaite & Garner, 2002; Prevent Blindness America, 2002). Functional impediments include, but are not limited to, vision loss and a decreasing ability to travel independently and perform routine and familiar tasks. There is also a decreased ability to ambulate safely and effectively, even in familiar environments. Distinguishing large and small objects may become a challenge (Carthwaite & Garner, 2002).

Diabetic retinopathy often affects the sharpness of one's vision, making it difficult to recognize facial features. Reading is challenging and difficult even with magnification. Devices for low vision such as magnifiers are more difficult to use because accommodation must be made for the acuity loss, while the visual field is also reduced. This process reduces the speed and comprehension of reading, so that the individual is only able to read a couple of letters at a time (Carthwaite & Garner, 2002; Castor & Carter, 1995). Another concern for individuals with diabetic retinopathy is their lack of adaptation for light to dark environments or vice versa, thus putting them at a greater risk for falls (Carthwaite & Garner, 2002; Castor & Carter, 1995).

Taking medication can be very difficult for individuals with vision loss. They are unable to measure their insulin, or read their medications or blood sugar levels. This impairment can make it virtually impossible to self-medicate. In addition, individuals with vision loss may experience difficulty examining their feet for various diabetic complications. Alternative methods must be explored to aid individuals with diabetic retinopathy in meeting their health care needs (Carthwaite & Garner, 2002; Sugunandran, 2011).

Glaucoma

Glaucoma also causes irreversible blindness and is among the leading causes of vision impairment. Glaucoma causes a gradual damage to the optic nerve that carries visual information from the eye to the brain (Carthwaite & Garner, 2002; Jampel, 2001; Walt, Chiang, Stern & Doyle, 2007; Zieve, Juhn, Eltz & Griggs, 2008). Several factors influence the risk of glaucoma, including age, race, diabetes, eye trauma, and long-term use of steroid medications. Glaucoma can also occur very suddenly. When this happens, it is a medical emergency. Glaucoma is almost three times as common among African Americans as it is in White Americans. Glaucoma increases rapidly in the Hispanic population for those over the age of 65

(Coogan, 2004). Individuals are not aware of the vision loss until a significant amount is lost; at that point, they are usually experiencing significant optic nerve damage (that carries visual information from the eye to the brain). Many individuals are unaware that they even have the disease because it results in a gradual damage to the optic nerves (Carthwaite & Garner, 2002; NIH/NEI, 2004). In most cases, glaucoma treatment can control and/or slow the progression of the disease or halt the disease (Jampel, 2001; Nordmann, Auzanneau, Ricard, & Berdeaux, 2003; Prevent Blindness America, 2002).

Early detection and treatment of glaucoma is necessary because even early stages of the disease can affect one's quality of life (Bournias, 2008; Mills, Janz, Wren, & Guire, 2001). However, in the past most ophthalmologists believed that if the individual did not have the disease at an advanced level or only experienced partial blindness, their living skills or quality of life would not be affected significantly. However, current research reflects that quality of life is affected significantly by early stages of glaucoma. This also indicates that in the early stages of glaucoma, patients need more assistance from care providers than previously recognized (Bournias, 2008; Jampel, 2001; Mills, Janz, Wren, & Guire, 2001; Nordmann, Auzanneau, & Ricard, & Berdeaux, 2003). The focus by ophthalmologists was primarily on keeping patients' intraocular pressure at an appropriate level. However, research has indicated that it is important to assess the patient's subjective experiences to identify and explore changes in their quality of life (Bournias, 2008; Walt, Chiang, Stern & Doyle, 2007).

Individuals with glaucoma deal with many challenges such as safety issues in traveling and/or mobility. There is a decrease in one's ability to ambulate without tripping over objects, traveling safely up and down stairs, and being able to travel effectively in the community. Individuals with glaucoma experience many problems with daytime driving, night driving, near vision, distance vision activities, and glare concerns (Bournias, 2008; Di Stefano, Huebner, Garber, & Smith, 2009).

Glaucoma impediments may include having problems in adapting to changes in light and dark environments, reduced acuity, and spatial vision. In addition, the individual with glaucoma has problems with visual processing of information, depth perception, color discrimination, peripheral vision and outdoor mobility (Bournias, 2008; Horvat, et al., 2003; Walt, Chaing, Stern, & Doyle, 2007).

Individuals with glaucoma have conditions that significantly impact their functional skills and their ability to perform daily activities (Walt, Chiang, Stern & Doyle, 2007). They have difficulty watching television and recognizing faces because of the vision loss. They have a major problem reading because of difficulties following lines in text when the field of view is very small (Carthwaite & Garner, 2002). When the individual has severe visual field loss, many activities are affected because the field of view is only extended to arm’s length. Safety in activities such as cooking is limited (Carthwaite & Garner, 2002; Walt, Chiang, Stern & Doyle, 2007).

Theoretical Framework

Social Cognitive Theory will be used in this study as the theoretical framework for understanding individuals with vision impairment confidence in taking medications and their independence in following their medication regimen. Self-efficacy is a key construct and derived from the social cognitive theory. Individuals with higher self-efficacy or self-confidence feel that they are able to perform a certain behavior, such as taking their medications. They are more likely to perform that behavior (Bandura, 2007; Baranowski, Perry, & Parcel, 2002). Bandura (2007) noted that perceived self-efficacy is an integral feature of the procedure used to access an individual’s efficacy beliefs. Perceived self-efficacy refers to the individual’s belief regarding their capabilities to produce an identified behavior that gives one influence over events that impact their lives (Bandura, 2007; Turner, Rimal, Morrison, & Kim, 2006).

Chlebaury, Myers, and Mendes (2010) noted that self-efficacy has shown to positively affect the initiation and performance of appropriate medical self-care behaviors. It has increasingly gained acceptance, both as an explanatory model of health behavior and a guide for health-related promotions and interventions (Bandura, 1993, 1977a). In fact, self-efficacy has been shown to be a causal mechanism in a wide range of health-related behaviors, such as taking medications, exercise, weight control, smoking cessation, etc. (Luszczynska & Schwarzer, 2005; Yalow & Collins, 1989).

Many prominent health theories include self-efficacy as a part of their developing concept (Bandura, 1993; Luszczynska & Schwarzer, 2005). Bandura, in his Social Cognitive Theory, explained that a personal sense of control often facilitates a change of health behavior. Self-efficacy beliefs are cognitions. The cognitions determine whether the change in the health-related behavior will take place. Cognitions determine how much effort will be expanded, and how long the behavior will be sustained when faced with obstacles as well as failures (Bandura, 1993; Luszczynska & Schwarzer, 2005).

Self-efficacy has assumed a very important role in health promotion, practice, and research (Maddux & Rogers, 1993). Health promotion interventions often enhance self-efficacy, which also fosters positive health behaviors (Maibach, Flora, & Nass, 1991). Bandura described self-efficacy as a cognitive process involving judgment of one’s ability to perform specific behaviors required to produce identified outcomes (Chlebowy & Garvin, 2006; Maddux & Rogers, 1983; Maibach & Murphy, 1995). Bandura also noted that self-efficacy is the link between one’s self-perceptions and individual actions (Bandura, 1993, 1977b; Lentz & Shortridge-Baggett, 2002; Pajares, 2002). Self-efficacy theory has served as a framework to help researchers understand chronic-disease-related behaviors and facilitate behavioral change in individuals (Lentz & Shortridge-Baggett, 2002; Pajares, 2002). This study will also incorporate this framework in understanding behaviors that facilitate individuals with vision impairments medication adherence as well as their confidence in taking their prescribed medications.

Population Affected by Non-Adherence to Medication Regimens

As the population ages, the use of prescription medications will increase. The literature notes that the aging population has a tendency to use more prescription medications, taking at least five prescription medications (American Foundation for the Blind, 2007; McMahon & Curtis, 2009; Wilson et al., 2007). This population also has difficulties reading their medication labels to appropriately administer their medications, a significant barrier for individuals with vision impairment (McMahon & Curtis, 2009). Vision loss affects individuals from those with very poor vision, to those with some sight but who are unable to identify shapes, to those individuals with only light perception (McMahon & Curtis, 2009; NIH/NEI, 2006, 2007; Strobel, 2003).

The Rehabilitation Act of 1973 and the Americans with Disabilities Act mandates that printed information must be accessible for individuals who cannot access information in the manner commonly used by sighted persons (U.S. Department of Justice, Civil Rights Division, Disability Rights Section, 2005). In addition, the Health Insurance Portability and Accountability Act also requires health information to be protected and made available in print and other media forms that are accessible for individuals (Janinszewski, Heath-Watson, Semidey, Rosenthal, & Do, 2006; Little, 2006).

The American Foundation for the Blind (AFB) conducted a national survey on attitudes and opinions associated with blindness or severe vision loss. The results indicated that Americans felt strongly that losing one's sight would have a significant negative impact on their quality of life. In terms of one's health condition, losing one's sight was viewed by surveyors as being the most negatively impacted (American Foundation for the Blind [AFB], 2009). In addition, respondents indicated that if they were to become blind or have severe vision loss, their biggest concern would be losing their independence and their ability to live alone (AFB, 2009; Horvat et al., 2003). Other significant responses that were of concern to the participants included not being able to read, not properly identifying their medication, safely moving about in the environment, and driving.

The size of the elderly population is rapidly changing in the United States (American Geriatrics Society [AGS] Foundation, 2005; Orr, Rogers, & Scott, 2006). Major demographic shifts in the country have prompted numerous concerns regarding social and health policies (AGS Foundation, 2005; Orr, Rogers, & Scott, 2006). With the increasing number of individuals who are elderly and visually impaired, there is an increased risk of being ill or hospitalized. It is necessary to know the accessibility issues that exist for this group of individuals (Lombardi & Kennicutt, 2001; McMahon & Curtis, 2009). Vision impairment is a problem that should be addressed in an individual's medical care (Guier, 2002; NIH/NEI, 2007; Orr, Rogers, & Scott, 2006). Eye disease may occur as a natural process; it can be a genetic condition in the family such as diabetes and high blood pressure, which can increase the likelihood that eye problems will occur (Meadows, 2002; Saaddine, et al., 1999). Losing one's vision is not a normal result of aging, though some changes may occur (NIH/NEI, 2007).

With vision loss, people have many challenges to address in reading print such as medication labels and other materials in their daily activities (Guier, 2002; McFeely, 2009; Orr, Rogers, & Scott, 2006). Vision loss can be found in all age groups; however, in the elderly it appears far more prevalent (Guier, 2002; McFeely, 2009). Having access to medication information to maintain a healthy quality of life is essential. The American Foundation for the Blind (2008a) also noted that there are approximately 20 million people with vision loss who have required some assistance in taking medication (McFeely, 2009).

Coons, Sumati, Keiningor, and Hays (2000) suggested that health-related quality of life is an essential element in the lives of individuals seeking healthcare with vision impairment. Losing one’s sight is a very frightening event. Vision is a dominant sense that is used to enhance the use of other senses. For older individuals, losing their vision may not be the only challenge that they are experiencing (Tuttle & Tuttle, 2004; Wahl, Schilling, Oswald, & Heyl, 1999). As the general population ages, they are likely to develop other health problems (Crews, Kirchner, & Lollar, 2006). They have medications that are prescribed and they are expected to take their medication as directed. It can be complicated if several different medications are prescribed and they are taken at different times of the day (Crews, Kirchner, & Lollar & 2006; Windham, et al., 2005).

In the elderly population, a significant number of individuals take more than two different medications daily. In fact, access to prescription information, such as instructions for usage and medication labeling, is essential and often challenging for many persons with vision loss (Coons, et al., 2000; Windham et al., 2005). There is an increase in prescribed as well as over-the-counter medications. This is an added challenge to older adults who are adjusting to vision loss or those who have a significant amount of vision loss. These challenges also exist in the general population (Coons, et al., 2000; Windham et al., 2005).

Vision is associated with one's ability to function adequately in their daily routine (Margolis et al., 2002). However, for older adults with vision loss, healthcare and medication adherence is a significant problem. The amount of medications purchased by older adults has increased. Medication non-adherence in this population is relatively low, as noted by Windham, et al. (2005). Non-adherence to prescribed medications results in poorer control of chronic health conditions (Gellad, Hass, & Safran, 2007). Physicians have patients with vision loss that cannot be corrected with eyeglasses, contact lens, medication, or surgery. When this occurs, the clinician is unable to help the client (Guier, 2002; Janiszewski, Heath-Watson, Semidey, Rosenthal, & Do, 2006). This response can be devastating for the client. It impacts the individual's ability to function independently and safely in one's environment. It affects the individual's ability to perform daily activities and health care. It also compromises the individual's total existence and leaves the individual feeling helpless and hopeless (Crews, Kirchner, & Lollar, 2006; Guier, 2002; Janiszewski, Heath-Watson, Semidey, Rosenthal, & Do, 2006; Rosenberg & Sperazza, 2008).

When individuals are unable to access health care information, they are vulnerable to many inequities in health care provision and social networks. Information is often not accessible. Individuals with visual impairment have difficulty reading normal-sized print. Normal print in most cases does not meet the needs of individuals with vision loss (Beverley, Bath & Booth, 2004; Drummond, Drummond, & Dutton, 2004; Rosenberg & Sperazza, 2008).

Health-related issues are of great concern for individuals with significant vision loss. Information associated with their health care, appointments, medication, when medications are taken, and side effects are all provided in standard print. Individuals with visual impairment cannot access this information because they are unable to read the print (Drummond, Drummond, & Dutton, 2004; Mitchell & Bradley, 2006; Tolman, Hill, Kleinschmidt, & Gregg, 2005). Individuals with vision loss may also experience major health-related problems because of their inability to self-medicate and their inability to read the information associated with their health care regime (Carthwaite & Garner, 2002; Drummond, Drummond, & Dutton, 2004; Zieve, Juhn & Eltz, 2008). Individuals with visual impairments are more likely to have a decline in functional activities and co-morbidity which exacerbates one's already functional limitations (Janiszewski, Heath-Watson, Semidey, Rosenthal, & Do, 2006; Mitchell & Bradley, 2006; Tolman, Hill, Kleinschmidt, & Gregg, 2005).

The quality of life has many elements that influence an individual's ability to live safely and comfortably in their environment. Access to necessary health-related information such as medication, types of prescriptions, doses, side effects, appointments, and so on impact quality of life (Orr, Rogers, & Scott, 2006). It is important that individuals with visual impairments have the necessary information to make informed decisions regarding their health care, as does any other sighted person (Windham, et al., 2005). When individuals with visual impairments are experiencing multiple health conditions, their functional capacity may decrease (Crews, Jones, & Kim, 2006; Crews, Kirchner, & Lollar, 2006). These conditions are serious enough to affect major aspects of their daily functioning and influence health-related conditions (Crews, Jones, & Kim, 2006).

The Need for Functional Life Skills

Life skills consist of education that facilitates the practice and reinforcement of psychosocial skills in a culturally and developmentally appropriate way. It contributes to the promotion of personal and social goals, occupational, health maintenance, the ability to address social problems, and the protection of human rights (Cimarolli, Boerner, & Wang, 2006; Goodship, 2012; Rubin, Chan, & Thomas, 2003; World Health Organization [WHO], 1999). In facilitating the achievement of one's goals, issues that occur in performing life skills must be appropriately diagnosed, reduced and/or removed or accommodated to obtain positive outcomes (Rubin, Chan, & Thomas, 2003).

Life skills are also an important factor in one's quality of life. Life skills are related to those behaviors used in day-to-day functioning and continued in one's lifestyle and maintenance (Cimarolli, Boerner, & Wang, 2006; Murphy & Williams, 1999; Venkatesh, 2012). Life skills and functional skills refer to a variety of skills that are often necessary in natural, domestic, vocational, and community environments. They are associated with real life events and experiences (Choosing Life Skills, 1998; EPIS Center, 2014; Goodship, 2012; Venkatesh, 2012).

There are several questions to consider when determining if an activity/skill is functional. These may include, but are not limited to, the following:

- Will the activity/skill increase the individual's ability to perform independently?
- Will the activity/skill reflect that the individual is competent to manage the task?
- How frequently is the activity/skill performed by the individual?
- Will the activity/skill be performed in different natural settings?
- If the individual is unable to perform the activity/skill, will someone else perform the task for him/her?

(Brown, Falvey, et al., 1980)

The World Health Organization defined life skills as one's ability for adaptive and positive behavior that help individuals in being able to cope and deal effectively with challenges and demands of everyday life (Venkatesh, 2012). Life skills encompass many components that include interpersonal, self-development, communication, social concerns, job, financial concerns, health, educational concerns, relationships with family, friends and others, anger management, and stress management. Educating individuals in life skills should be a fundamental right for individuals of all ages, which is an indispensable key for personal and social improvements (World Education Forum, 2000). Effective use of life skills can enhance one's abilities in such areas as vocational interest, job seeking, communication, social needs, and leisure activities. These behaviors are a necessary part of one's ability to perform life skills (Brown, Falvey, et al., 1980; Choosing Life Skills, 1998; Cimarolli, Boerner, & Wang, 2006; Venkatesh, 2012). Use of effective life skills enables individuals to function successfully in their daily routines and in multiple roles as members of a family, community, and workforce (National Literacy Act, 1993; Venkatesh, 2012; World Education Forum, 2000).

Challenges exist for individuals with vision impairments that far exceed challenges faced by sighted individuals (Jutai, Strong, & Russell-Minda, 2009; Stelmack, 2001). Individuals with vision impairment have greater challenges in their ability to perform many life skills, daily activities, and functional skills that are significant to one's quality of life or health (Jutai, Strong, & Russell-Minda, 2009; Stelmack, 2001; Venkatesh, 2012). Examples of this include skills such as managing one's medical care, personal care such as dressing, eating, writing, reading, traveling from place to place, socialization, and communicating with others (Lamourex, Hassell, & Keeffe, 2004; Stelmack, 2001). However, these skills are often taken for granted. Such skills are vital to the individual's ability to function independently in his or her environment (Guier, 2002; Stelmack, 2001; Venkatesh, 2012).

A major concern for all individuals is healthy living and the ability to access or read information. Individuals with vision loss have greater challenges, which they must address in being able to perform many life skills. Being able to perform daily activities is significant to one’s quality of life (Jutai, Strong, & Russell-Minda, 2009; Stelmack, 2001; Venkatesh, 2012). These life skills are necessary and often taken for granted, but they are vital to the individual’s ability to function independently in his or her environment (Guier, 2002; Ray, Horvat, Williams, & Blasch, 2007; Stelmack, 2001; Venkatesh, 2012).

Vision loss in many cases affects the patient’s ability to function and effectively administer their medication, in addition to other daily living activities (Crews, Kirchner, & Lollar, 2006; McFeely, 2009). About half of the older populations do not take their medications properly. In fact, 5% to 12% of older adults have trouble seeing, even with conventional methods such as eyeglasses and/or contact lenses. As a result, it is hard for them to correctly read medication bottles and other instructions; it is also difficult to identify one prescription from another (Crews, Kirchner, & Lollar, 2006; McFeely, 2009; Windham, et al., 2005).

Patients that find it difficult and cumbersome to take their medication may result in noncompliance. In addition, errors in medication can be critical (Guier, 2002; Windham, et al., 2005). Stelmack (2001) noted that vision loss is associated with one’s ability to function, which includes taking care of daily needs such as self-medication and many other quality of life activities.

Life skills are an important factor in one’s quality of life (Murphy & Williams, 1999; Venkatesh, 2012). Life skills include the ability to use knowledge to perform learned tasks or develop the ability to do something for one’s self in areas that influence daily functioning (visual skills, social functioning, mental status, medication management/health, and independence).

Effective use of life skills enables individuals to function successfully in their multiple roles as members of a family, community, and workforce (Choosing Life Skills, 1998; Venkatesh, 2012).

Caregiver, Family and Significant Others' Involvement

Silva-Smith, Theune, and Spaid (2007) noted that individuals with vision impairment require the assistance of others at various levels to achieve their daily activities. Family members and significant others contribute to their quality of life. Caregivers are also described as family members or friends. They provide assistance to family members that are visually impaired. They are aware of the medical and functional skills of the individual (Ankri, Andrieu, Beaufils, Grand, & Henrard, 2005; Fuhr, Martinez, & Williams, 2008; Silva-Smith, Theune, & Spaid, 2007). When individuals are faced with vision impairments such as decreased visual acuity, it reduces the ability of individuals to care for themselves and others (Bernbaum, Albert, Duckro, & Merkel, 1993; Fuhr, Martinez, & Williams, 2008).

There were approximately 125 million persons in the United States during the year 2000 living with chronic health conditions or disabilities. This number is expected to increase significantly in the future (Fuhr, Bethany, & Williams, 2008; Silva-Smith, Theune, & Spaid, 2007). The literature asserts that 44.4 million individuals provided some level of informal care to adult family members with physical disabilities or some type of chronic illness during a one-year period. The supportive care provided by caregivers to their family members or others enabled them to remain in their homes. Caregivers provide various supportive care and link individuals with vision loss to other services (Travis, et al., 2003).

Caregivers also help their family members in specific ways by providing assistance with such things as preparing meals, eating, bathing, financial management, traveling, housekeeping chores, medical appointments, medication, and various forms of clothing preparation. These individuals are informal caregivers that are unpaid; however, the value of their caregiving has been estimated to amount to over $257 billion annually (Fuhr, Martinez, & Williams, 2008).

The literature indicates that individuals who are visually impaired experience difficulty seeing visual information. These individuals report a reduced quality of life and limitations in daily functional activities. There are numerous activities that contribute to one's quality of life; however, because of the vision loss, basic functional skills become a greater challenge for these individuals (Fuhr, Martinez, & Williams, 2008; Owsley, McGwin, Sloane, Stalvey, & Wells, 2001).

Family members and friends are often confused by the individual's ability to function and their loss of vision. Traveling independently appears to be a problem. Loss of mobility in unfamiliar environments also creates a problem. It was reported that individuals with visual impairment felt that they received extra attention from family members, which reduced their feelings of independence (Feely, Vetere, & Myers, 2007). Family members and friends lack knowledge of the disease. They fail to realize that an individual has lost some central and peripheral vision, which is not clear for individuals as well as their family. They still have the use of some of their vision to function (Becker, Wahl, Schilling, & Burmedi, 2005; Carthwaite & Garner, 2002).

Caregivers are able to assist the individual with vision loss in many of their life skills. Some common functional skills are difficult because of the vision loss such as decreased facial recognition, major problems in reading small print, problems writing, reading checks, and a decreased ability to gather, store, and retrieve information. Individuals with visual loss have a reduced ability to recognize and administer their medications, problems with mobility evolves, risks of injury from falls are increased, as are problems with daily activities such as shopping, grooming, cleaning, inability to drive a car, managing health issues (e.g., medications and doctor's appointments), and lack of ability to perform numerous tasks that require one to use visual cues (Fuhr, Martinez, & Williams, 2008; Owsley, McGwin, Sloane, Stalvey, & Wells, 2001).

For individuals with diabetes and vision loss, these conditions can affect them in different ways, from little impact on their families to becoming overprotective (Nora, Kelly, & Matlock, 2006). There are restrictive food selections and portions, which in some cases have a positive impact on how they are treated, and how meals are prepared. However, having vision loss negatively affects the livelihoods of individuals. They are no longer able to drive. They experience loss of employment, they have moved from two incomes to a single income, or they experience role reversal between husband and wife (Nora, Kelly, & Matlock, 2006).

As the U.S. population continues to age, an increasing number of individuals will experience blindness, and the cost effectiveness of preventing unnecessary dependence will be even more important. Successful rehabilitation will be achieved through active program participation, and peer support from those who have learned to manage various medical complications and activities of daily living effectively (Lamoureux, Pallant, et al., 2007; Mahon & Curtis, 2009; Scott, Smiddy, Schiffman, Feuer, & Pappas, 1999).

Studies have shown that among caregivers, stress levels and physical and psychological morbidity are elevated in this population. Caregivers appear to be at an increased risk for poor immune function, illness, infection, and depression. In fact, review of the literature suggests that caregivers experiencing mental and physical health problems may appear to provide care to individuals at a lower quality (Beach, 2005; Fuhr, Martinez, & Williams, 2008; Silva-Smith, Theune, & Spaid, 2007).

When individuals are involved in the rehabilitation process, family involvement is a very important aspect of the individual's adjustment (Fuhr, Martinez, & Williams, 2008). This involvement enlightens and educates family members. It helps to reinforce rehabilitation skills for the individual at home, work, and in the community. Caregivers and family members assist the individual with vision loss to adjust by identifying problems or misconceptions that may negatively affect their adjustment to the vision loss (Di Stefano, Huebner, Garber, & Smith, 2009; Mcllvane & Reinhardt, 2001; Silva-Smith, Theune, & Spaid, 2007).

Use of Assistive Technology and Assistive Aids

Data from the National Center for Health Statistics noted that of 41.8 million Americans with disabilities, in the United States approximately 10 million individuals are blind or visually impaired. People in the U.S. that are aged 18 years and older require some form of assistive technology (American Society of Consultant Pharmacists Foundation, 2008; Carlson, Ehrlich, Berland, & Bailey, 2001). The current National Center for Health Statistics data reflect the following:

- 8.3 million Americans with disabilities needed special equipment or assistive technology (AT) to perform basic activities of daily living (ADLs) such as bathing or showering, dressing, eating, getting in and out of bed or chairs, walking, getting outside, and using the toilet, including getting to the toilet (Carlson, Ehrlich, Berland, & Bailey, 2001) .
- 16.6 million Americans with disabilities used special equipment, aids or assistive technology (Carlson, Ehrlich, Berland, & Bailey, 2001).
- 15.4 million Americans with disabilities reported using assistive technologies that were primarily medical (Carlson, Ehrlich, Berland, & Bailey, 2001).

- 14 million Americans with disabilities lived in homes modified to meet their special needs (Carlson, Ehrlich, Berland, & Bailey, 2001).
- Just over 400,000 Americans with disabilities were provided special accommodations that included readers, oral and sign language interpreters, job coaches, personal assistants, job design or slowing the pace of tasks, reduced work hours and more breaks, part-time work and other types of equipment, help, and work arrangements (Carlson, Ehrlich, Berland, & Bailey, 2001).

The literature reflects that there are nearly 250,000 individuals in U.S. households who specifically use assistive technology devices for their vision loss (Russell, Hendershot, LeClere, Howie, & Adler, 1997).

Even with the negative consequences and the prevalence of vision loss among older adults, research on assistive technology for individuals with vision impairment and functional life skills in regard to healthy living has received little attention (Horowitz, Brennan, Reinhart, & MacMillan, 2006). Passage of the Technology-Related Assistance Act of 1988 (P.L. 100-407) provided support to individuals with disabilities and enabled them to gain access to services and assistive technology (Martin, 2001; Riviere, 1996).

What does assistive technology mean for individuals with vision loss? Assistive technology is a tool that assists individuals with vision loss to master a task or to complete desired projects that may have been out of reach had they not had the tool (Minnesota Adult Basic Education Disabilities, n.d.; Riviere, 2001). It is important for the individual with vision loss because it enables them to be in control of their properties and behavior to preserve their autonomy and attainment of important goals (Becker, Wahl, Schilling, & Burmedi, 2005).

AFB (2014) noted that clients with vision impairment may also benefit from large-print display that include size and thickness of print adjustments, style of print, contrast between print and background adjustments, accommodations for glare that is adjusted by the monitor display, and audio equipment. Audio devices that read information are also valuable to help individuals with visual impairment to access information. Accommodations needed for travel for individuals with vision impairment are provided in the orientation and mobility training which instructs patients with vision loss to successfully ambulate through the environment safely (Janinszewski, Heath-Watson, Semidey, Rosenthal, & Do, 2006; Mitchell & Bradley, 2006).

Assistive technology and aids enhance their ability to self-actualize and perform tasks independently. Assistive technology has drastically changed the way individuals with disabilities function in society. It has become the equalizer for many individuals with vision loss and other impairments. Assistive technology has enabled individuals with vision loss to continue to be productive individuals in achieving and maintaining their individual goals to move closer to the American dream (AFB, 2014; Casciato, 2007; Martin, 2001; Riviere, 2001).

The Cost to Society

In the United States, visual impairment is among the 10 most prevalent causes of disability with 240,000 new cases per year (Carthwaite & Garner, 2002; Stroupe et al., 2008). In addition, major adult vision disorders have substantial impact and the cost continues to elevate with the increase in ocular diseases. In the United States, the cost of care for major adult visual disorders was estimated to be more than $35.4 billion; and $57.5 million was attributed to medical costs for patients with macular degeneration, which is the leading cause of vision loss in older adults (Stroupe et al., 2008).

Congress signed into law the Medicare Prescription Drug Improvement and Modernization Act of 2003 (P.L. 108-173). This legislation directed the Centers for Medicare and Medicaid Services (CMS) to carry out a Low Vision Rehabilitation Demonstration Project. The purpose of the project was to assess the impact of adding certified low vision therapists, certified vision rehabilitation therapists, and orientation and mobility specialists as Medicare reimbursement for vision rehabilitation services (Mogk, Watson, & Williams, 2008).

CMS described its objectives in the demonstration project to identify whether or not vision rehabilitation could be established as a budget neutral service in which, for example, fewer falls and hip fractures could pay for the vision rehabilitation services (Lyles, Watson, & Williams, 2008). The project had flaws in it. Therefore, recommendations were made to restructure or terminate the demonstration project. Congress continues to debate on increases to Medicare coverage for rehabilitation services. Rehabilitation scientists continue to explore methods to evaluate and determine various approaches that improve the quality of life for persons with vision impairment (Szlyk, et al., 2004).

In some areas, vision rehabilitation services were provided with up to 12 hours of service per patient per year, as needed. In addition, services are billed by the supervising physician and occupational therapist and to the payer for services provided to the client with vision impairment (Mogk, Watson, & Williams, 2008). The extended cost associated with treatment and care to the individual with visual impairment and the cost to society should not be underestimated.

Prevent Blindness America Reports

It is estimated that vision loss costs the federal government significant taxable income. In addition, the annual care costs are more than $4 billion annually. For people with vision impairment who were born in 2000, lifetime costs will reach $2.5 billion (Trophy, Lynn, &

Glass, 2003). For one visually impaired person, the average lifetime cost for managing these impairments is approximately $566,000 (Friedman, Congdon, Kempen, & Tielsch, 2002; Ophthalmology Times, 2007; Trophy, Lynn, & Glass, 2003).

Outpatient and pharmaceutical services make up the most direct medical costs. For patient ages 40 to 64 years, the largest direct medical cost is for inpatient services related to cataract and glaucoma. The breakdown of direct annual medical costs for outpatient, inpatient, and prescription drug services for the major diseases affecting the aging eye:

- Cataract ($6.8 billion)
- Refractive error ($5.51 billion)
- Glaucoma ($2.86 billion)
- Age-related macular degeneration ($0.57 billion)
- Diabetic retinopathy ($0.49 billion)

Direct costs for Americans ages 40 to 64 years are $7.94 billion; direct costs for Americans ages 65 and above are $8.30 billion (Ophthalmology Times, 2007). Nearly $11 billion of the total $11.2 billion in direct nonmedical costs goes to nursing home care. Although only 4.3% of the general population aged 65 years or older live in nursing homes, for people who are visually impaired or blind, the proportion living in nursing homes are 16% and 40%, respectively. Measuring quality of life or health utility loss in chronic medical conditions is estimated at $10.5 billion for visual impairment and blindness (Ophthalmology Times, 2007).

Vision impairment remains a significant problem for individuals as they age. It impacts every aspect of one’s life and influences how individuals view themselves and the world around them. Visual impairment impacts one’s quality of life in numerous ways. Visual impairment often has a negative effect on the individual’s ability to manage their health care and their ability to function independently. It impacts the individual's emotional status, physical status, as well as the functional level of the individual. Visual impairment can exist with other medical conditions and increase the chances of major medical problems developing. Awareness is needed to assure that necessary resources can be aligned to enhance research, treatment, and prevention of our nation's increasing eye problems (NIH/NEI, 2002). As our aging population continues to increase, the resources that are needed to enhance services to individuals with visual impairment must be made available to aid in maintaining one's independence in managing their medication regime that supports their quality of life (Ophthalmology Times, 2007; Orr, Rodgers, & Scott, 2006).

Age-related vision impairment is a condition that affects the quality of life of many individuals, altering the way they interact with their environment and posing a major threat to daily functioning (Girdler, Packer, & Boldy, 2008; MacLaughlin, et al., 2005). Society must be made aware of this growing population of individuals with vision impairment. Information is needed to prepare for the challenges of current and future treatments to provide healthcare and rehabilitation services for this population (Orr, Rodgers, & Scott, 2006; NIH/NEI, 2002).

Loss of vision impacts the individual's social roles, their participation in various civic activities and their overall quality of life. Various activities are cultivated into one's social responsibilities. Older adults who had a complex medication regime and vision loss show complications in their ability to adhere to their medication regime. They lack visual skills and they are unable to correctly administer their medication (MacLaughlin, et al., 2005).

Summary

It is imperative that health care providers and patient educators recognize the needs of patients with visual impairments. Barriers to health care negatively impact their ability to be self-sufficient and diminish their quality of life. Vision impairment affects one’s ability to read or access information that is vital to their health care in such ways as medical appointments, medication regime and so on.

When individuals are no longer able to manage their own daily skills or tasks, it negatively influences all aspects of their life, emotionally and socially, in addition to the financial implications that they must endure (MacLaughlin, et al., 2005). Assistive technology has enabled individuals to obtain levels of functioning that facilitate greater independence and enhances the control individuals have over their lives (Becker, Wakl, Schilling, & Burmedi, 2005; Patton, 2009).

Family members and caregivers play a significant role in helping individuals with a visual impairment adjust to the changes in their vision. Caregivers and family members help the individual with vision loss maintain the necessary goals that are needed to function independently. Having the support and assistance of caregivers helps individuals with vision loss to accomplish goals that are in their best interest (Boerner & Cimarolli, 2005). They often provide levels of support that encourage individuals with visual impairment to continue to participate in many of the activities that they participated in before they lost their vision. Communication aids in helping individuals with visual impairment to adjust and feel comfortable in the environment in which they function.

Appropriate resources can be identified and persons with vision impairment should not be left on the doorstep, but offered an entry to resources through rehabilitation services (Boerner & Cimarolli, 2005). Rehabilitation that specializes in services for the visually impaired can help clients in many ways through assistive devices and training. Rehabilitation enhances independence and one’s ability to successfully follow their medication regime and daily functional life skills. Networking to explore available resources that can meet the needs of the older adult population is important (AFB, 2011; Crews &Campbell, 2001; Levasseur, Desrosiers & St-Cyr Tribble, 2008).

Vision loss in combination with other medical conditions substantially compromises the performance in various activities and health-related services. Vision loss does not occur in isolation but is highly associated with various other conditions. It is important to address the interaction between visual impairment and other conditions of older adults. There are major implications for policy development and influence in the areas of clinical services, healthcare, aging and disability, and rehabilitation (AFB, 2011; Crews & Campbell, 2001).

Reducing visual impairments, increasing preventive eye care, and increasing use of rehabilitation services are all public health priorities. The complexity of trying to enhance one's quality of life, along with other major causes of vision loss in the adult population implies that assistance is needed. When health care, rehabilitation, and public health agencies work together to enhance and promote health care it increases life skills, social participation, and one's quality of life. The cost of supportive care for individuals with vision loss can also have a profound impact on financial costs for the individual, government, and society in general (AFB, 2011; Levasseur, Desrosiers & St-Cyr Tribble, 2008).

CHAPTER III. METHOD AND INSTRUMENTATION

This study was designed to explore medication adherence and self-efficacy of individuals with visual impairments. These individuals often experience difficulty with taking their prescribed medication, coping with medication regimens, and accessing medical information related to their vision condition(s). This study was based on the literature that individuals with vision impairments lack access to their own health care information, which ultimately influences their confidence, as well as their ability, to take their medications and meet scheduled medical appointments. In addition, a lack of consideration of patients with vision impairments as active participants in their health care decisions may inhibit their ability to make informed decisions about their medical care. This chapter discusses the design of the study, sources of data, profiles of the organizations from which the sample was selected, method of procedure, privacy and confidentiality of participant data collected, instrumentation, and data analysis.

Design of the Study

This design was a survey research study to investigate the self-efficacy and medication adherence among individuals with vision impairments. Data related to participants' demographic and personal information related to medication taking and participant coping skills was collected using an Adherence Demographic Survey (ADS). Part I of the ADS instrument collected participant demographic data and personal information. Part II of the ADS asked participants to respond to four open-ended questions related to their coping skills. In this study, the dependent variables were medication adherence as measured by the Adherence to Refill and

Medications Scale (ARMS) and self-efficacy as measured by the Self-Efficacy for Appropriate Medication Use Scale (SEAMS).

Sources of Data

Population and Sample

The population for this study was all individuals served at the time of this study by one or more of the following three local chapters of their corresponding national organization: Georgia Council for the Blind (GCB), Blinded Veterans Association Georgia Regional Group (BVAGRG), or the National Federation of the Blind of Georgia (NFB). The sample for this study were individuals from the population of those served by one or more of the organizations for the blind and who volunteered to complete the survey form.

Profiles of Organizations from which the Sample was Selected

The Georgia Council for the Blind (GCB) is a nonprofit consumer organization that is affiliated with the American Council of the Blind (ACB). The GCB Columbus local chapter has 20 members. The GCB has provided forums for the views of individuals with blindness for more than 40 years. The GCB has been involved in many activities to promote the welfare of individuals with vision impairment such as improving education and rehabilitation services, broadening vocational opportunities, legislative actions, scholarships, peer support, exhibits, assistive technology, newsletters, social activities, and braille (American Council of the Blind [ACB], 2012).

The Blinded Veterans Association Georgia Regional Group is an affiliate of the Blinded Veterans Association (BVA); it has 53 members in the regional group. The BVA began at the end of World War II. The BVA is an organization of blinded veterans helping blinded veterans. The BVA supports its members through service programs, regional groups, resources, and advocacy in the legislative and executive branches of government. All legally blind veterans are eligible for assistance whether they become blind during or after active duty military service (BVA Georgia Regional Group, 2009). The BVA was chartered by the U.S. Congress to speak and write on behalf of blinded veterans in national legislative affairs. Throughout the history of the BVA, the Department of Veterans Affairs (formerly the Veterans Administration) has recognized the BVA as the exclusive voice for blinded veterans nationwide (BVA Georgia Regional Group, 2009).

The National Federation of the Blind (NFB) was founded in 1940 (NFB, 2013). The organization advocates for the civil rights and equality of Americans who are visually impaired. The organization develops innovative education, assistive technology, and training programs for the blind and those who are losing their vision. The NFB provides individuals with the tools they need to become independent and successful (NFB, 2013). The NFB is a non-profit, 501c (3) volunteer organization. The Georgia chapter was established in 1972 and charted in 1973 as a state affiliate. The NFB is recognized as the oldest and most influential national organization of individuals with blindness in the United States (NFB, 2013).

Privacy and Confidentiality of Data Collection

Proper steps were taken to ensure the privacy and confidentiality of the data collected. Permission was obtained by the researcher from the Institutional Review Board (IRB) at Auburn University to conduct the study (see Appendix A). In addition, as required by Auburn University, IRB approval was received. Approval was also received from each organization selected to participate in this study. A copy of the approval letter from each organization is included in the appendices. Data were collected from the participants. Only the researcher, her major professor, and a committee member who assisted with data analysis, have access to the survey data. Data obtained from this study were reported in aggregate form and remain anonymous.

Instrumentation

A two-part questionnaire, the Adherence Demographic Survey (ADS) developed by the researcher, was administered to each participant during an organizational meeting of the local chapter. Part I of the ADS has 24 items designed to collect information such as:

(1) Gender (male, female);

(2) Type of vision impairment (cataract, glaucoma, macular degeneration, retinitis pigmentosa, diabetic retinopathy, trauma, and other);

(3) Marital status (married, single, divorced, widow); (4) Age range (22–30; 31–39; 40–48; 49–57; 58–66; 67–75; 76–84; 85 and over);

(5) Education level (high school, GED, some college, college graduate, masters education, beyond master's degree);

(6) Current employment status (full-time, part-time, unemployed, homemaker, retired, student, volunteer);

(7) Housing arrangement (live alone, live with spouse, live with other family member, live with friend, live in residential facility);

(8) Travel independently outside the home (yes/no);

(9–17) Travel methods (car, taxi, bus, wheelchair, use mobility cane, sighted guide, support cane, special mode of transportation, walk alone independently [with no cane];

(18) Assistance in taking medications (yes/no);

(19) Use of assistive technology to take medication (yes/ no);

(20) Ability to read large print on newspaper headings (yes/no);

(21) Ability to read small print on newspaper (yes/no);

(22) Ability to read medication labels (yes/no);

(23) Ability to see the medication pills (yes/no); and

(24) Requires the assistance of others in reading (yes/no).

Part II of the ADS has four open-ended items that collect information related to the coping skills of participants. These items were formulated by the researcher to address barriers to and consequences of taking medications. These open-ended items allow the participants to express their coping skills in their own words.

The Adherence to Refills and Medication Scale (ARMS) was developed to evaluate an individual's self-reported adherence to taking and refilling their medications. The instrument's psychometric properties revealed high internal consistency, reliability, test-retest, and criterion-related validity (Kripalani, Risser, Gatti, & Jacobson, 2009). The ARMS was comprised initially of 14 items. The factor analyses included 14 items based on the eigenvalues that showed a three-factor solution which accounted for 47.9% of the variance. The factor analyses resulted in a two-factor solution for the 14 items, but it did not result in a clear separation of the items as intended by the instrument design (Kripalani, Risser, Gatti, & Jacobson, 2009).

Factor analysis was conducted on the reduced item scale of 12-items (without questions 1 and 9). As a result, a two-factor solution was forced and the items clustered as expected, which also supported the reduction of items from the scale to 12 items (Kripalani, Risser, Gatti, & Jacobson, 2009).

On Factor 1, the eigenvalue of 4.209 explained 35.1% of the variance. Factor 1 included eight of the items. The eight items assessed adherence to taking medication correctly. For

Factor 2, there was an eigenvalue of 1.199 and it accounted for 10.0% of the variance. It assessed adherence to refilling medications on schedule with four of the items. Both subscales consisted of a total of 12 items for the ARMS (Kripalani, Risser, Gatti, & Jacobson, 2009).

Cronbach's α was 0.794 for the first subscale. The total item correlations ranged from 0.344 to 0.598. Cronbach's α was 0.641 for the second subscale and the total item correlations ranged from 0.408 to 0.514. Cronbach's α alpha for the full scale is high (α = 0.82).

The ARMS demonstrated high internal consistency and high correlation with older standardized measures. For the ARMS, the distribution of scores was created by treating each item on the 12-item instrument as a four-point question; scores ranged from 12 to 34 (mean = 16.32, standard deviation [SD] = 4.06). The eight-item subscale consisted of taking medications. The 8-item subscale scores ranged from 8 to 29 (mean = 10.33, SD = 2.66). On the 4-item subscale, refilling medications reported scores ranging from 4 to 14 (mean = 5.99, SD = 1.98). The lower scores indicated better adherence (Kripalani, Risser, Gatti, & Jacobson, 2009). The 4-item prescription refill subscale assesses a patient's ability to refill medications. The combined 12-item scale on the 4-point Likert-type scale yielded a composite score range of 12 to 48 points (Kripalani, Risser, Gatti, & Jacobson, 2009). Patients with low ARM scores indicate better adherence to medication. ARM has a valid and reliable self-reported medication measure on adherence which performs well across literacy levels (Kripalani, Risser, Gatti, & Jacobson, 2009). Permission to use the ARMS for this study was requested and received from the developer of the scale (see Appendix B).

The Adherence to Refills and Medications Scale (ARMS) is also designed to evaluate medication adherence for populations with chronic conditions. It is designed to include two distinct subscales supported by the overall factor analysis of the ARMS. The 8-item medication taking subscale assesses a patient's ability to self-administer the prescribed regimen correctly (Risser, Jacobson, & Kripalani, 2007).

The Self-Efficacy for Appropriate Medication Use Scale (SEAMS) is a valid self-reported scale. It is a 13-question instrument to assess barriers and self-efficacy (Lousa, Holzworth, & Ansani, 2011). The SEAMS measures confidence in one's ability to self-administer medication properly. The SEAMS was designed to assess self-efficacy for appropriate medication use for patients with chronic diseases across a range of literacy levels (Risser, Jacobson & Kripalani, 2007). The importance of medication non-adherence as well as patients health was explored by the authors (DiMatteo, 2004; Osterberg & Blaschke, 2005; Risser, Jacobson, & Kripalani, 2007). Their research has indicated that low literacy is a risk factor for medication non-adherence (Chew, Bradley, Flunn, Cornia, & Koepsell, 2004; Kalichman, Ramachandran, & Catz, 1999). Risser, Jacobson, and Kripalani (2007) suggested that low-literacy individuals may have some difficulty understanding certain items, which may also lead to potential biased responses.

The SEAMS was developed using items with simple wording that may be beneficial for use in a low-literacy population. The instrument was also designed to be generated across medical conditions and lifestyles. In the development of the instrument, questions were selected from several other instruments. Priority was given to these items in published psychometric analyses that performed well and crested a balance across a range of situations (Ogedegbe, Mancreso, Allegrante, & Charlson, 2003; Risser, Jacobson, & Kripalani, 2007). A content map of selected questions and a pool of new items were generated to fill any gaps, mainly in areas of medication use that may present challenges for low-literacy patients (Risser, Jacobson, & Kripalani, 2007).

The questions were linked to a three-point response scale (Risser, Jacobson, & Knipalani, 2007). Smith, Wakely, deKruif, and Swartz (2003) noted that scales with broad response options have not shown to be beneficial. Participants were asked to respond to indicate, their level of confidence about taking medications correctly (1 = not confident, 2 = somewhat confident, and 3 = very confident).

The possible score for the original 21-item scale ranged from 21 to 63. For the SEAMS, the higher scores indicated higher levels of self-efficacy for medication adherence (Risser, Jacobson, & Knipalani, 2007). The mean responses on each of the 21 items ranged from 1.91 to 2.91.

In the original 21-item scale, the principal factor analysis resulted in a fair factor solution that was based on eigenvalues > 1. A four-factor solution was identified from the scree plot. Factor 1 resulted in 36.05% of the variance being explained, while for all four factors together accounted for 54.6% of the variance. Item numbers 3, 4, 13, and 19 (four items) loaded greater than 0.4 on more than one factor (Risser, Jacobson, Kripalani, 2007). On the first two factors, 14 items were loaded and the remaining 6 items were loaded on the two remaining factors. The results indicated that it was difficult to clearly identify associated dimensions of self-efficacy for each of the four factors. Therefore, the factors were not identified at this point (Risser, Jacobson, Kripalani, 2007).

The SEAMS performed well in the reliability analysis; however, it did not factor in any notable domains. Therefore, a reduced set of items was tested and the general self-efficacy questions (items 1 and 2) were excluded. Also, items that shared a different question format (items 17 to 21) were excluded. Item 14 was also excluded with the lowest item-total correlation, low inter-item correlations performed poorly in subgroup analysis of literacy (Risser, Jacobson, & Kripalani, 2007).

The remaining 13 items resulted in two-factory solution with items 3, 4, 5, 6, 8, 9, and 10 that loaded onto Factor 1. For Factor 2, items 7, 11, 12, 13, 15, and 16 were loaded on. Two clear dimensions were indicated self-efficacy for taking medications under difficult circumstances (factor 1) and self-efficacy for continuing to take medications when circumstances surrounding medication-taking are uncertain (factor 2) (Risser, Jacobson, & Kripalani, 2007).

Item 10 was found to agree with Factor 1. On both factors item 10 loaded > 0.4. The reduced 13-item scale resulted in interitem correlations of 0.20 to 0.71 high total correlations for the reliability analysis and a Cronbach's alpha of 0.89. Cronbach's alpha was 0.86 and 0.7 for the two subscales, taking medications under different circumstances and under conditions of uncertainty. Mean interitem correlations for the 13-item scale was 0.38, 0.46 and 0.39. and the same reflected for the two subscales. The 13-item scale test –retest reliability was adequate (Spearman's p = 0.57, p = .0001) (Risser, Jacobson, & Kripalani, 2007). The researcher obtained permission to use the SEAMS from the developers **(**see Appendix C).

Method of Procedure

Before the study began, approval to conduct the study was sought from the Institutional Review Board for Research Involving Human Subjects (IRB) at Auburn University. The researcher contacted each president of the three local organizations by telephone to request the organization's participation in the study and provided information on the purpose of the study (see Appendix E). Presidents and participants were assured that the participant data will remain anonymous.

After receiving permission from the IRB, an information letter was e-mailed to each organization's president, the Georgia Council for the Blind (GCB), the Blinded Veterans Association Georgia Regional Group (BVAGRG), and the National Federation of the Blind (NFB) Georgia Chapter (see Appendix D). The information letter further explained the purpose of the study and requested further support for the study. The President of the National Federation for the Blind, Columbus Chapter had responded with a permission letter to conduct the study (see Appendix E). Later, BVAGRG and the GCB also responded with permission to conduct the study (see Appendix F & Appendix G). In addition, a request was made for permission to attend one monthly meeting for each organization to solicit participation in the study.

All participation was voluntary. The survey instruments were self-reported as being completed independently or with the use of a proxy (family member or friend). A letter with a statement on confidentiality was given to each participant and their proxy (see Appendix H). After completing the surveys, participants placed surveys in a drop box at the meeting of their organization. The survey data remained anonymous.

Data Analysis

Data were entered into an IBM SPSS (Version 21) spreadsheet for analysis. Demographic information was calculated using descriptive statistics to report the frequency and percent of the following variables: What were the demographic and personal information related to medication taking selected for this study in terms of (a) gender, (b) type of vision impairment, (c) marital status, (d) age range, (e) education, (f) current employment status, (g) housing arrangement, (h) travel independently outside the home (yes/no), (i) travel methods, (j) assistance in taking medications, (k) use of assistive technology to take medication, (l) ability to read large print on newspaper headings, (m) ability to read small print on newspaper, (n) ability to read medication labels, (o) ability to see the medication pills, and (p) requires the assistance of others in reading. Descriptive data such as frequency and percent and were calculated. These data were collected on Part I of the Adherence Demographic Scale (ADS). Part II of the ADS asked participants to respond to four open-ended questions that address their coping skills. The researcher analyzed these items by organizing comments into similar categories to explore whether or not common themes could be identified. In addition, unique responses were recorded. All participant responses provided implications for the results.

A one-sample t-test was used to test three of the null hypotheses. All statistical results were tested at the 0.05 probability level ($p = .05$). A one-sample t-test was used to test the first null hypothesis. The first null hypothesis stated no statistically significant difference in observed scores and the test value of 10.33, which was the median score on the Adherence to Refill Medication Scale (ARMS) on the first subscale for individuals who followed their prescribed medication regimens. The median score on the scale was identified by the scale developers when field testing the instrument (Kripalani, Risser, Gatti, & Jacobson, 2009).

A one-sample t-test was used to test the second null hypothesis. The second null hypothesis states that there was no statistically significant difference in observed scores and the test value of 5.99, the median score on the subscale of Adherence to Refill Medication (ARMS) for individuals who refill their medication on schedule. The median score was set by the scale developers (Kripalani, Risser, Gatti, & Jacobson, 2009). A one-sample t-test was used to test the third null hypothesis.

The third null hypothesis stated that there was no statistically significant difference in observed scores and the test value of 26, which is the midpoint on the Self-Efficacy for

Appropriate Medication Use Scale (SEAMS) for individuals with vision impairments feelings of confidence in their ability to manage their medication independently. The range of possible scores on the SEAMS is 13 to 39 points. Since no specific cut-off score or test value was provided by the scale developers, the researcher set the test value at 26, as a reasonable expectation of one's self-efficacy for taking medications (Kripalani, Risser, Gatti, & Jacobson, 2009). The midpoint of the scale was derived by summing the maximum number of points possible for the middle column of the scale (a value of 2), which indicates that a person is somewhat confident in self-efficacy for taking medications.

The fourth null hypothesis stated that there is no statistically significant difference in mean scores on the Self-Efficacy for Appropriate Medication Use Scale (SEAMS) for individuals with vision impairments who use assistive aids in taking their medications and those who do not use assistive aids. An independent samples t-test was used to test the fourth null hypothesis.

CHAPTER IV. DATA ANALYSIS AND RESULTS

Chapter I of this study provided an introduction, statement of the problem, purpose of the study, research questions, statement of the hypothesis, design of the study, sources of data, definition of terms, limitations of the study, assumptions of the study, need for the study and significance of the study. The purpose of the study was to investigate the self-efficacy and medication adherence of individuals with vision impairments that hold membership in three organizations in the State of Georgia that provide supportive services to this population. Participants in this study were individuals with vision impairments that reside in the State of Georgia. Participants in the study acquired their vision impairments at different periods in their lifetime, either at birth or later in life.

For the purpose of this study, vision impairment is defined as those individuals with a condition of the eye that is not corrected by standard eyeglasses, contact lenses, medication or surgery (NIH/NEI, 2006). This condition of the eye interferes with the individual's ability to perform activities of daily living. There are several terms used to describe an individual's eye condition when they are diagnosed as having vision impairment. They may include, but are not limited to, the following: total blindness, legal blindness, low vision, vision impairment, functional limitations to seeing and severe limitations (Carthwaite & Garner, 2002; Kelly, 2009; Safran, et al., 2005). The International Classification of Diseases (ICD)-9CM classification of visual impairment is used as the classification system to associate an eye disease with a specific code for vision impairment (Freeman, et al., 2007; NIH/NEI, 2006).

Chapter II presented a review of the literature relevant on self-efficacy of individuals associated with vision challenges. Terminology provided definition of terms, explanation of impairment, the prevalence of vision impairment and blindness in the population, the major causes of visual impairment in the United States, age-related muscular degeneration, cataract, diabetic retinopathy, and glaucoma. In addition, the theoretical framework for the study was discussed, the population affected by non-adherence to medication regimens was examined, the need for functional life skills, an examination of the use of assistive technology and assistance aids, the cost of society and the report on prevention of blindness in America was reviewed. Chapter III discussed methods and instrumentation, design of the study, sources of data, profiles of organizations from which the sample was selected, privacy and confidentiality of data collection, instrumentation, method of procedure and data analysis. Chapter IV focuses on the results of the data analysis.

Data Analysis

Descriptive data such as frequencies and percents were summarized for gender, type of vision impairment, marital status, age range, education, current employment status, housing arrangement, travel independently outside the home, travel methods, assistance in taking medications, use of assistive technology to take medication, ability to read large print on newspaper headings, ability to read small print on newspaper, ability to read medication labels, ability to see the medication pills, and need for assistance from others in reading. Descriptive data such as frequency and percent were calculated. The data were collected on Part I of the Adherence Demographic Survey (ADS). This information was used to answer research question one.

Part II (Coping Skills) of the ADS responded to research question two that consisted of four open-ended questions. A theme was generated from the responses on each open-ended question. The researcher assessed the responses to identity a common theme for each of the questions using a qualitative approach. The themes were used to support associated questions in the research that were answered using quantitative data.

Research questions three, four, five and six were answered by testing the null hypothesis at the .05 level of significance. Question three, four, and five were tested with their associated null hypotheses using the one sample t-test. Question six and the associated fourth hypothesis was tested using the independent samples t-test.

Results of Research Question One

The first research question was: What are the demographic characteristics of individuals with vision impairments who were participants in the study (held membership in the Georgia Council of the Blind, Georgia Regional Group of the Blinded Veterans Association and/or the Georgia Chapter of the National Federation of the Blind? The following tables show the frequencies and percents of the demographic information for participants with vision impairment in the study.

Demographic characteristics for all participants with vision impairment used in this study were summarized in terms of the following: gender, type of vision impairment, marital status, and age range. In addition, demographics also included education level, employment status, housing arrangement, travel independently outside, travel methods, assistance in taking medications, use of assistance technology to take medication, ability to read large print on newspaper headings, ability to read small print on newspaper, ability to read medication labels, ability to see medication pills, and requiring the assistance of others in reading. The total number of individuals with vision impairments that participated in the study was 52.

Gender, Type of Vision Impairments, Marital Status, and Age Group

The majority of the individuals with vision impairments were males (59.6%). Females were represented by 40.4% of the participants. The type of vision impairments were addressed by the participants. The majority of the participants indicated their type of vision impairment as "Other" (36.5%). For other responses, there were several different responses; the leading type of vision impairment for "Other" was birth blindness. The next highest response for vision impairment for the population sample was glaucoma and retinitis pigmentosa (21.2% for both types). Nearly sixty percent (59.6%) of the sample with vision impairments were between 49 to 66 years of age and 46.2% were married. Table 1 shows the frequencies and percents of the demographic information for participants for gender, type of vision impairment, and marital status. Table 2 shows the frequencies and percent's of the demographic information for participants for age group.

Table 1

Frequencies and Percentages of Individuals with Vision Impairments by Gender, Type of Vision Impairments, and Marital Status

Variable	Frequency	Percent
Gender		
Males	31	59.6
Females	21	40.4
Type of Vision Impairments		
Cataract	1	1.9
Glaucoma	11	21.2
Macular Degeneration	2	3.8
Retinitis Pigmentosa	11	21.2
Diabetic Retinopathy	3	5.8
Trauma	5	9.6
Other*	19	36.5
Martial Status		
Married	24	46.2
Single	13	25.0
Divorced	10	19.2
Widow	5	9.6

*Blindness at birth leading ‘Other’

Table 2

Frequencies and Percentages of Individuals with Vision Impairments by Age Group

Variable	Frequency	Percent
Age Group		
22 to 30	3	5.8
31 to 39	3	5.8
40 to 48	5	9.6
49 to 57	10	19.2
58 to 66	21	40.4
67 to 75	8	15.4
76 to 84	2	3.8
Total	52	100.0

Education Level

For education level, the majority indicated that the highest degree held by the sample was college graduate that reflects 26.9% of the sample, followed by high school (25%), beyond master's degree and master's degree each reflected 21.2%. Also for employment status, the majority of the sample were retired (42.3%), but for those participants that were employed the results reflected 32.7% of the sample. Table 3 shows the frequencies and percentages of the demographic information for participants for education level and employment status.

Table 3

Frequencies and Percentages of Individuals with Vision Impairments for Education Level and Employment Status

Variable	Frequency	Percent
Education Level		
High School	13	25.0
Some College	3	5.8
College Graduate	11	26.9
Masters Education	14	21.2
Beyond Masters	11	21.2
Employment Status		
Full-time	12	23.1
Part-time	5	9.6
Unemployed	8	15.4
Homemaker	3	5.8
Retired	22	42.3
Student	2	3.8

Living Arrangements

Housing arrangement reflected the majority of the sample resided with their spouse, 53.8%. The next highest indicator for living arrangement reported by the sample was living alone, 28.8%. Table 4 provides the results of the frequencies and percentages for housing arrangements.

Table 4

Frequencies and Percents of Individuals with Vision Impairments for Housing Arrangements

Variable	Frequency	Percent
Housing Arrangements		
Lives Alone	15	28.8
Lives with Spouse	28	53.8
Lives with Other Family	7	13.5
Lives with Friend	2	3.8
Total	52	100.0

Travel Outside Independently

When asked if they travel outside independently at home, the majority of the sample population indicated that they traveled outside independently (67.3%) while 32.7% indicated that they did not. Table 5 shows the frequencies and percentages of the demographic information for participants for independent travel.

Table 5

Frequencies and Percentages of Individuals with Vision Impairments for Travel Independently Outside Home

Variable	Frequency	Percent
Travel Outside Home	35	67.3
No Travel Outside Home	17	32.7

Travel Methods

For travel methods, individuals in the sample used several different methods to travel independently outside the home. They included: car (84% = yes; 8% = no), taxi (19.2% = yes; 80.8% = no), bus (48% = yes; 52% = no), wheelchair (5.8% = yes; 94.2% = no), mobility cane (42.3% = yes; 57.7% = no), sighted guide (32.7% = yes; 67.3% = no), support cane (25% = yes); 75% = no), and walk alone independently (19.2% = yes; 80.8% = no). Table 6 shows the frequencies and percentages of the demographic information for participants for travel methods.

Table 6

Frequencies and Percentages of Individuals with Vision Impairments by Travel Methods

Variable	Frequency	Percent
Travel Methods By Car		
Car Travel	44	84.6
No Car	8	15.4
Travel Methods By Taxi		
Taxi Travel	10	19.2
No Taxi	42	80.8
Travel Methods By Bus		
Bus Travel	25	48
No Bus	27	52
Travel Methods By Wheelchair		
Wheelchair Travel	3	5.8
No Wheelchair	49	94.2

Table 6 (continued)

Variable	Frequency	Percent
Travel Methods By Mobility Cane		
Mobility Cane Travel	22	42.3
No Mobility Cane	30	57.7
Travel Methods By Sighted Guide		
Travel With Guide	17	32.7
No Guide Travel	35	67.3
Travel Methods By Support Cane		
Travel With Support	13	25.0
No Support Cane	39	75.0
Travel Methods By Walking Alone		
Walk Alone Independently	10	19.2
No Walking Alone	42	80.8

Taking Medication

When asked if participants required assistance in taking their medications, the majority of the sample (53.8%) indicated that they did not require assistance in taking their medication, but some (46.2%) indicated that they required assistance in taking their medications. For assistive technology/aids to take one’s medication, half of the participants (50%) indicated that they did not use assistive technology/aids in taking their medication while half of the participants (50%) did use technology. Table 7 shows the frequencies and percentages of the demographic information for participants for taking medication and the use of assistive technology/aids.

Table 7

Frequencies and Percentages of Individuals with Vision Impairments by Ability to Take Medication and Assistive Technology/Aids

Variable	Frequency	Percentages
Assistance with Medication	24	46.2
No Medication Assistance	28	53.8
Use Assistive Technology/Aids	26	50.0
No Use of Technology/Aids	26	50.0
Total	52	100.0

Ability to Read

Participants also responded to questions that indicated if they were able to read print on the newspaper. Participants were asked if they were able to read large print such as the heading on newspapers. The results reflected that 42.3% indicated that they were able to read the newspaper headings, while 57.7% indicated that they were unable to read the newspaper headings. Participants where asked if they were able to read small print on the newspaper. Participant's response reflected that 9.6% indicated that they were able to read the small print on the newspaper, while 90.4% indicated that they could not.

When participants were asked about their ability to also read the labels that were placed on their medication, 21.1% of the participants indicated that they were able to read medication labels, while 78.8% indicated that they were unable to read their medication labels. Table 8 shows the frequencies and percentages of the demographic information for participants on ability to read.

Table 8

Frequencies and Percentages of Individuals with Vision Impairments by Ability to Read

Variable	Frequency	Percentages
Read Large Print	22	42.3
No Reading Large Print	30	57.7
Read Small Print	5	9.6
No Reading Small Print	47	90.4
Able to See Labels	11	21.2
Unable to See Labels	41	78.8

Ability to See

Participants were asked if they were able to see their medication pills. Of the participants that responded, 32.7% indicated that they were able to see their medication pills, while 67.3% indicated that they were not able to see their medication pills. The question was asked if participants requested the assistance of others in reading their medication. Of the participants that responded to this question, 86.5% indicated that they require the assistance of someone else in reading printed material. Table 9 shows the frequencies and percentages of the demographic information for participants on ability to see.

Table 9

Frequencies and Percentages of Individuals with Vision Impairments by Ability to See

Variable	Frequency	Percentages
Able to See Pills	17	32.7
Unable to See Pills	35	67.3
Assistance in Reading	45	86.5
No Help in Reading	7	13.5

Results for Research Question Two

Question Two consisted of four open-ended questions as indicated below. Information was collected on coping methods on four open-ended questions associated with taking medication for individuals with vision impairments. The questions were examined to obtain central themes from the responses.

The open-ended questions that were presented included the following:

a) What coping methods do you use in taking your medications?

b) What is the greatest barrier to taking your medication?

c) If you missed or have not taken your medications, what have been the consequences?

d) What assistive technology do you use to take your medications?

Question 2(a) was regarding coping methods used in taking medications. Participants responded by providing a list of their responses to the question. The researcher identified a central theme by categorizing the responses. The responses that reflected the majority of similar responses by category were identified as the central theme for the question.

Results for Question 2(a), Coping Methods used in Taking Medications, indicated that 48% of the responses reflected the majority of the responses for a category. The majority indicated that they organized their medication by pill box, bottle, and/or some type of container. The central theme for method used in taking medication was organizing medication by pill box or other container. However, it is noteworthy to also mention that 39% of the participants also indicated that they required assistance with medication as a coping method used in taking medication.

Question 2(b) was “What are the greatest barriers in taking your medications?” For Question 2(b) the participants addressed the greatest barriers to taking one’s medications by providing a list of barriers. The researcher identified a central theme by categorizing the responses. The responses that reflected the majority of similar responses by category were identified as the central theme for the question.

Results for Question 2(b), participants noted coping methods used in the greatest barriers in taking medications by providing a list of barriers. The majority of the participants (56%) fell into a category for central theme of individuals with vision impairments that indicated that their greatest barrier in taking medication was not being able to read the medication label for the type of medication and other information. For Question 2(b), the central theme was not being able to read the medication label that represented the majority of the category responses.

Question 2(c) was “If you missed or had not taken your medication on time, what would be the consequences?” For Question 2(c) the participants addressed if missed medication what would be the consequences by providing a list of consequences. The researcher identified a central theme by categorizing the responses. The responses that reflected the majority of similar responses by category were identified as the central theme for the question.

For Question 2(c), the researcher identified a central theme by categorizing the responses. The responses that reflected the majority of similar responses by category were identified as the central theme for the question.

The majority of the participants (65%) fell into a category for central theme of individuals with vision impairments that indicated that they would experience deterioration in their health (physical or mental) if they missed or did not take their medication. For question 2(c), the central theme was health deterioration that represented the majority of the category responses.

Question 2(d) was “What assistive technology or aids do you use to take your medication?” For Question 2(d) the participants addressed the assistive technology or aids they used to take their medication by providing a list of devices. The researcher identified a central theme by categorizing the responses. The responses that reflected the majority of similar responses by category were identified as the central theme for the question.

Results for Question 2(d) were identified. The majority of the participants (44%) fell into a category for central theme of individuals with vision impairments that indicated that they used assistive technology or aids to take medication. For Question 2(d), the central theme was assistive technology or aids for taking medication that represented the majority of the category responses.

Results for Research Question Three

The third research question was “To what extent do individuals with vision impairments follow their prescribed medication regimens as measured by the Adherence to Refills and Medication Scale (ARMS)”. The first null hypothesis was formulated to answer research question 3.

$Ho_{1:}$ There is no statistically significant difference in observed scores and the test value of 10.33, the median score on the subscale of Adherence to Refill Medication Scale (ARMS) set by the scale developers for individual who follow their prescribed medication regimens.

Following are the results of the first null hypothesis for question 3.

Null hypothesis 1 showed that the observed mean of 10.71 for subscale 1 taking medication as prescribed and standard deviation (SD) was 2.40. There was no statistically significant difference from 10.71 $t_{(51)}=1.14$, $p=.26$. Therefore, the researcher failed to reject the null hypothesis. The null hypothesis states there is no significance difference in observed mean scores and the test value of 10.33; the researcher failed to reject this hypothesis at the .05 level. The 95% confidence interval for the difference of the observed mean scores for taking medication as prescribed ranged from -.29 to 1.05. The observed outcome is expected 26% of the time if the hypothesis is true. The results do not support that individuals with vision impairment follow their prescribed medication regimens as measured by the ARMS. In other words, there was not sufficient evidence to support that individuals with vision impairment took their prescription medication on schedule or the way that the medication was prescribed.

Results for Research Question Four

The fourth research question was "To what extent do individuals with vision impairment refill their medication on scheduled as measured by Adherence to Refills and Medication Scale (ARMS)?" The second null hypothesis was formulated to answer research question 4.

$Ho_{2:}$ There was no statistically significant difference in observed scores and the test value of 5.99, the median score on the subscale of Adherence to Refills and Medication (ARMS) for individuals who refill their medication on schedule.

Following are the results of the second null hypothesis for question 4.

$Ho_{2:}$ showed the observed mean of 6.13 for the subscale for refilling medication on schedule and the standard deviation (SD) of 1.794. There was no significant difference from 6.13, t(51) = .581, p = .56. Therefore, the researcher failed to reject the null hypothesis.

The null hypothesis states that there is no statistically significant difference in the observed mean and the test valve of 5.99; the researcher failed to reject the null hypothesis at the .05 level. The 95% confidence interval for the difference ranged from -.35 to .64 on the observed means scores for refilling prescribed medication on schedule. The observed outcome is expected to occur 56% of the time if the null hypothesis is true. However, the evidence does not support individuals with vision impairments refill their medication on schedule or as indicated on their prescription.

Results for Research Question Five

The fifth research question was "To what extent do individuals with vision impairments feel confident in their ability to manage their medication independently as measured by the Self-Efficacy Adherence Medication Scale (SEAMS)?" The following third null hypothesis was formulated to answer research question 5.

$Ho_{3:}$ There was statistically significant difference in observed scores and the test value of 26, which is the midpoint on the Self-Efficacy for Appropriate Medication Use Scale (SEAMS) for individuals with vision impairments feelings of confidence in their ability to manage their medication independently.

The following are the results of the third null hypothesis for question 5.

Null hypothesis 3 showed the observed mean 29.0 on all 13 items on the SEAMS scale and the standard deviation was 6.817. There was a statistically significant difference from 29 t(51)= 3.17, p=.003. Therefore, the researcher rejected the null hypothesis, which states there is no significance in the observed scores and the test value 26 is the mid-point on the SEAMS for individuals with vision impairments feelings of confidence in their ability to manage their medication independently. The researcher rejected the null hypothesis at the .05 level. The 95% confidence interval for the difference in the observed mean scores in all items on the SEAMS ranged from 1.10 to 4.90. The observed outcome is expected to occur 32% of the time if the hypothesis is true. In other words, there is a statistically significant difference, which supports the statement that individuals with vision impairment were somewhat confident to very confident in their perception of self-efficacy for appropriate medication use.

Results for Research Question Six

The sixth research question was "To what extent is there a difference in the confidence level of individuals with vision impairments who use assistive technology/aids in taking their medications and individuals who do not use technology/aids in taking medication as measured by the Self-Efficacy for Appropriate Medication Use Scale (SEAMS)?" The fourth null hypothesis was formulated to answer research question 6.

Ho_4: There is no statistically significant difference in mean scores on the Self-Efficacy for Appropriate Medication Use Scale (SEAMS) for individuals with vision impairments who use assistive aids in taking their medications and those who do not use assistive aids.

The following are the results of the fourth null hypothesis for question 6.

Null hypothesis four showed that the sample mean score was 27.81 for the use of assistive technology to take medication (SD = 5.59). However, for participants that indicated that they did not use technology/aids to take their medications, the mean score was 30.19 and the standard deviation (SD) was 7.79.

The results indicated the following for participants that did use technology/aids to take their medications and those that did not use technology/aids to take their medications at the .05 level; t(50) = 1.269, p = .21. There is no statistically significant difference in the mean scores on the Self-Efficacy for Appropriate Medication Use Scale (SEAMS) of individuals with vision impairments who use assistive aids in taking their medications and those who do not use assistive aids. Therefore, the researcher failed to reject the null hypothesis at the .05 level.

There were no statistically significant differences between the users and the non-users of assistive technology/aids feeling confident to take their medication. The results also suggested that whether individuals are users or non-users of assistive technology/aids, it does not influence their confidence level in taking of medication.

Summary

This chapter discussed the results of the data analysis. Descriptive data presented in this chapter summarizes the demographic characteristics of individuals with vision impairments used in this study. The majority of the population with vision impairments was males. For type of vision impairment, among the leading causes of vision loss was marked ‘Other’ with the majority of ‘Other’ (32%) representing blind at birth. The majority of the sample population was between 58 to 66 years of age, married, held a master’s degree, retired, and living with spouse.

The majority of participants also indicated that they traveled independently outside of the home and their travel methods. Of the sample population that traveled, most participants traveled outside the home independently, by car, and the least was by wheelchair, bus, and walking alone independently.

Ability to take medication was addressed by the sample population. The majority of the sample population indicated that they did not require assistance in taking their medication, they did not use assistive technology/aids in taking their medication, and they did not use assistive technology/aids in taking their medication.

Ability to see was addressed by the sample population. The majority of the sample population indicated that they were able to read the large headings in the newspaper; however, they were unable to read the small print on the newspaper and they were unable to read medication labels. Also, the majority of the sample population indicated that they were able to see their medication pills but still required assistance of others in reading newspaper or medication information.

There were four open ended-questions that addressed coping methods used for taking medications. The following themes were generated:

(a) Organizing Medication by Pill Box or Container
(b) Unable to Read
(c) Health Deterioration (physical or mental)
(d) Talking Device or Script-Talk Device

The chapter also provided the results on three questions that used the one sample t-test. The questions examined individuals' with vision impairment ability to follow their prescribed medication regimens as measured by the Adherence to Refill Medication Scale (ARMS), ability to refill medication on schedule as measured by Self-Efficacy for Appropriate Medication Use Scale (SEAMS), and individuals' with vision impairments feeling confident in their ability to manage their medication independently as measured by the Self-Efficacy Adherence Medication Scale (SEAMS).

The last question was examined using an independent sample t-test. This question examined the difference in the confidence level of individuals with vision impairments who use assistive technology/aids in taking medications and individuals who do not use technology/aids in taking to access medication as measured by the Self-Efficacy for Appropriate Medication Use Scale (SEAMS).

There was only one statistically significant difference with the use of the t-test while three questions were not statistically significant. An overview of this study, summary of results, limitations, implications, conclusion, recommendations for practical applications, and summary are present in Chapter V.

CHAPTER V. OVERVIEW OF THE STUDY

The problem of non-adherence to medication regimens has received much attention during the last decade, but limited research has been done to examine self-efficacy and medication adherence for individuals with vision impairment. Individuals with vision with impairments have challenges in accessing information and managing their medication. The challenges that exist for this population in taking their medication as prescribed as well as their confidence level in taking their medication has not been thoroughly examined.

The purpose of the study was to investigate the self-efficacy and medication adherence of individuals with vision impairments. The study also investigated an individual's confidence level associated with tasks such as ability to read medication labels, ability to take medication as prescribed, and use of assistive technology/aids when taking medication. The study also examined such factors as coping methods in taking medication, barriers to taking medication, consequences of not taking medication, and assistive technology/aids used in taking medication.

The focus of this study was individuals with vision impairments, perception of their ability to take prescribed medication, participants' ability to refill their medication on schedule, participants feeling confident in their ability to manage their medication independently, and differences in the confidence level of individuals with vision impairments who use or do not use assistive technology/aids in taking medication. Participants were individuals with a type of vision impairment that ranged from legally blind to totally blind. The participants held membership in at least one of three organizations in the State of Georgia that provide services and advocacy to populations with vision impairments. Members of organizations such as Columbus Chapter of Georgia Council for the Blind, Columbus Chapter of the National Federation of the Blind, and the Regional Group of the Blinded Veterans Association were participants. The organizations represent members residing in the State of Georgia. The demographic characteristics used in this study were gender, type of vision impairment, marital status, age range, education, current employment status, housing arrangement, travel independently outside the house travel methods, assistance in taking medications, use of assistance technology to take medication, ability to read large print on newspaper headings, ability to read small print on newspaper, ability to read medication labels, ability to see the medication pills, and need for assistance from others in reading.

Sources of data were collected from the members of the three organizations that participated in the study. Participation was voluntary and participants responded to surveys as self-reported (independently) or by using a proxy. Presidents of each of the organizations were contacted through electronic email. They were also sent a letter requesting their participation, information about the study, and a request to attend the organization's meeting to discuss the projects, solicit their support, and to answer any questions. There were 52 participants that completed surveys, representing both males and females with vision impairments holding membership in at least one of the three organizations.

Adherence behavior has mostly been investigated in the areas of disease factors, patient characteristics, referral and appointment process, therapeutic regimens and patient-provider interaction (American Foundation for the Blind [AFB], 2005; Ho, Bryson, & Rumsfeld, 2009; Kripalani, Risser, Gatti, & Jacobson, 2009). Adherence behavior is considered active voluntary and collaborative involvement of the individual in behavior that is mutually acceptable and behavior that produces a therapeutic result (Ho, Bryson, & Rumsfeld, 2009).

However, there has been limited research on self-efficacy and medication adherence for individuals with vision impairment. An individual's ability to safely manage their healthcare is influenced by their ability to access information regarding their healthcare and medication. Obtaining necessary health related information such as medication, types of prescriptions, doses, side effects, appointments and so on impact one's healthcare.

Self-efficacy has been used to explain a wide range of health behaviors associated with medication adherence. Self-efficacy has been defined as an individual's personal belief regarding their capabilities to carry out a specific task to achieve a desired outcome. As a result, adherence is defined in the literature as the extent to which individuals take medications as prescribed by their health care provider (Ho, Bryson, & Rumsfeld, 2009; Ogedegbe, Mancuso, Allegrante, & Charlson, 2003).

On the other hand, there has been little research involving self-efficacy and medication adherence among individuals with vision impairment. Most of the research involving self-efficacy has been in healthcare and has been shown to predict a wide range of health behaviors including medication adherence (Ogedegbe, Mancuso, Allegrante, & Charlson, 2003). Healthcare providers are becoming increasingly aware of the significance of medication adherence to health management and ways to detect non-adherence to medication adherence. Medication non-adherence is a significant public health problem; individuals that are non-adherent to their medication do not readily divulge such information unless they are given specific reasons to do so. Health-related issues continue to be of great concern for individuals with vision impairments. Information regarding their healthcare and prescribed medication is often not accessible to them. Individuals with vision impairment have difficulty with reading what is considered normal print. Often, individuals with vision impairments are unable to read or gain access to information necessary for managing their healthcare (AFB, 2014; MacLaughlin, et al., 2005; Prime, 2012).

The significance of the study has both practical and theoretical applications. In practical terms, addressing issues associated with self-efficacy of individuals with vision impairments helps to identify problems associated with taking medication, access to medical information and adherence to a medication regimen that would impact one’s ability to manage their healthcare. When individuals are able to access information, adhere to their medication regimens, meet scheduled medical appointments, and meet urgent care visits, they are better able to understand the importance of adhering to recommendations made by their healthcare provider.

Self-efficacy in medication management, independence in managing one’s care, and the cost effectiveness and practice of preventive care helps individuals to better understand the importance of adhering to their recommended healthcare plan. In addition, to being aware of the demographic characteristics of participants, this information also suggest that we need further options for accessing information and for managing medication. This information can be used to provide an awareness of the challenges, as well as improved services to individuals with vision impairments in accessing their health information and services. This study will also add to the limited body of knowledge on self-efficacy and medication adherence among the population of individuals with vision impairments in the country

Summary of Results

This study investigated the answers to the following research questions: (1) What are the demographic and personal information related to medication taking that was selected for this study in terms of (a) gender, (b) type of vision impairment, (c) marital status, (d) age range, (e) education, (f) current employment status, (h) housing arrangement, (i) travel independently outside the house (j) travel methods, (k) assistance in taking medications, (l) use of assistance technology to take medication, (m) ability to read large print on newspaper headings, (n) ability to read small print on newspaper, (o) ability to read medication labels, (p) ability to see the medication pills, and (q) need for assistance from others in reading. Research question two consisted of four open-ended questions: (a) What coping methods do you use in taking your medications? (b) What are the greatest barriers to taking medication? (c) If you missed or have not taken your medications, what has been the consequence? (d) What assistive technology do you use to take your medications? Research question three stated, "To what extent do individuals with vision impairments follow their prescribed medication regimens as measured by the Adherence to Refills and Medication Scale (ARMS)?" Research question four stated, "To what extent do individuals with vision impairments refill their medication on schedule as measured by the Self-Efficacy for Appropriate Medication Scale (SEAMS)? Research question five stated, "To what extent do individuals with vision impairments feel confident in their ability to manage their medication independently as measured by the Self-Efficacy for Appropriate Medication Use Scale (SEAMS)? Research question six stated, "To what extent is there a difference in the confidence level of individuals with vision impairments who use assistive technology/aids in taking their medications and individuals who do not use technology/aids in taking medication as measured by the Self-Efficacy for Appropriate Medication Use Scale (SEAMS)?

Question one addressed the demographics of individuals with vision impairments that were members in at least one of the three non-profit organizations representing the blind and visually impaired in the State of Georgia. Frequencies and percentage tabulations were computed on the participant's demographic information. Of the 52 individuals that were visually impaired in the study, the majority were males (59.6%). Females were represented by 40.4% of the participants with vision impairments. Type of vision impairment was "Other" (36.5%) with Blind at Birth the leading of the 'Other" responses. The next highest response for type of vision impairment was glaucoma and retinitis pigmentosa (21.2% for both types). Approximately 59.6% of the participants were between 49 to 66 years of age and 46.2% were married.

The highest education level of the participants was college graduate at 26.9%, followed by high school (25%), categories of mater's degree and master's degree and beyond reflected the same results (21.2%). Of the 52 participants with vision impairment, 42.3% were retired and 32.7% were employed (part-time and full-time).

In terms of housing arrangement, 53.8% resided with their spouse and 28.8% lived alone. Of the participants that traveled outside of their home, 67.3% traveled independently and 32.7% did not travel outside of their home independently. The participants with vision impairment used several methods of traveling as their preferred choice. The travel methods included 84.6% car method, 19.2% taxi method, 48% bus method, 5.8% wheelchair method, 42.3% mobility cane, 32.7% sighted guide method, 25% support cane method, and 19.2 walked alone independently.

For taking medication with assistance, 28% did not require assistance. Fifty-three percent (52.8%) did not use assistive technology/aids when taking their medication. Of the participants with vision impairment, 42.3% were able to read large print such as newspaper headings. Only 9.6% were able to read small print on the newspaper. In addition, 21.1% of the participants were able to read the medication labels and 32.7% were able to see their medication pills. However, 86.5% of the participants with vision impairment when reading required the assistance of others.

Question two identified coping methods in taking medication for participants with vision impairments in the study. The four open-ended questions generated the following themes from each question. Coping methods used in taking medication generated the theme, ‘use of pill box or other container’. For the identification of greatest barriers to taking medication generated the theme, ‘not able to read medication labels’. Coping methods when not taking medication and the consequences generated the theme ‘deteriorated health’ (mental, physical). Coping method on assistance technology/aids used when taking medication generated the theme ‘voice over devices/script-talk devices’.

Question three investigated the extent to which individuals with vision impairments follow their prescribed medication regimens as measured by the Adherence to Refills and Medication Scale (ARMS). The null hypothesis Ho_1 used to address this question found no statistically significant difference in observed scores and the test value of 10.33, the median score on the subscale of the Adherence to Refill Medication Scale (ARMS) set by the scale developers, for individuals who follow their prescribed medication regimens. The results of the one-sample t-test procedure indicated that in terms of individuals with vision impairments following their prescribed medication regimens as measured by the ARMS, did not support that individuals in the sample followed their medication regimens.

Question four investigated the extent to which individuals with vision impairments refill their medication on schedule as measured by the Adherence to Refills and Medication Scale (ARMS). The following hypothesis was used to address the question.

Ho_2: There was no statistically significant difference in observed scores and the test value of 5.99, the median score on the subscale of the Adherence to Refills and Medication Scale (ARMS) for individuals who refill their medication on schedule. The results of the one-sample t-test procedure indicated that in terms of individuals with vision impairment refilling their medication on schedule as measured by the ARMS, it did not support that individuals refilled their medication on schedule.

Question five investigated to what extent individuals with vision impairments feel confident in their ability to manage their medication independently as measured by the Self-Efficacy Adherence Medication Scale (SEAMS). The following hypothesis was used to address this question:

Ho_3: There was no statistically significant difference in observed scores and the test value of 26, which is the midpoint on the Self-Efficacy for Appropriate Medication Use Scales (SEAMS) for individuals with vision impairments feeling of confidence in their ability to manage their medication independently.

The results of the one-sample t-test procedure indicated that in terms of individuals with vision impairment feeling confident in their ability to manage their medication as measured by the SEAMS, results indicated that there is a statistically significant difference to support the statement that individuals with vision impairments were somewhat confident to very confident in their perception of self-efficacy for appropriate medication use.

Question six investigated to what extent is there a difference in the confidence level of individuals with vision impairments who use assistive technology/aids in taking their medications and individuals who do not use technology/aids in taking medication as measured by the Self-Efficacy for Appropriate Medication Use Scale (SEAMS). There is no significant difference in the confidence level of individuals with vision impairments who use assistive technology/aids in taking their medications and individuals who do not use technology/aids in taking medication. For individuals with vision impairments who use assistive technology/aids in taking their medications and those who do not use assistive technology/aids, the results of the independent sample t-test procedure indicated that in terms of individuals with vision impairments confidence level the results did not support that there was a significant difference in the confidence level of those that used assistive technology/aids and confidence levels of those that did not use assistive technology.

Limitations

The findings of this research study were based entirely on individuals with vision impairments that were members of at least one of the three nonprofit organizations identified that provide services to individuals with vision impairments in the State of Georgia. The results must be interpreted with caution for three reasons. First, the term 'vision impairment' is defined to include a range of visual diagnoses, indicating that the range of vision will also vary. The level of vision may be adequate to meet the needs of some individuals and when used on other levels it may be an inhibitor for various other tasks. Therefore, there may have been individuals with vision impairments as well as being diagnosed as legally blind or having low vision that have some vision to meet their needs for managing their medication independently, but poor in doing other tasks. In addition, there may have been participants that were vision impaired but not to the extent that one would be identified as legally blind but only low vision.

Second, the population for this study was limited to individuals with vision impairments that held membership in one of the following nonprofit organizations: Columbus Chapter of the Georgia Council for the Blind, Columbus Chapter of the Regional Group of the Blinded

Veterans Association and the Columbus Chapter of the National Federation of the Blind. Third, the results may not be representative of individuals with vision impairments since the sample from this study was obtained from only three non-profit advocacy organizations located in the State of Georgia.

Despite these limitations, this study provides information that will be useful in medication adherence research for this population. It may provide information that may be useful in understanding the role of self-efficacy and medication management for individuals with vision loss as well as understanding the need to provide reasonable accommodations for individuals with vision impairment in accessing health-related information so that they may manage their healthcare independently.

Conclusion

To the extent that the data collected in this study were valid and reliable and the assumptions of the study were appropriate and correct, the following conclusions may be made. Based on the results of this study, it may be concluded that there were more males than females that participated voluntarily in the study specifically males represented 59.6% of the population surveyed. For type of vision impairment represented, 36.5% were other (blind at birth was the leading response), whereas 42.4% represented glaucoma and retinitis pigmentosa combined. Having vision impairment impacts one’s ability to see as well as read print of various sizes. It especially impacts one’s ability to read and interpret print since 57.7 % were unable to read large print such as the headings in newspaper. There were 90.4% that indicated that they could not see the small print provided in the newspaper. Labeling of medication along with other printed medication information is usually written in small print. In many cases, information provided in small print does not give individuals with vision impairments access to medical information

(AFB, 2005, 2008b; Drummond, Drummond, & Dutton, 2004; Eustace, Johnson, & Gault, 1982). It is also noteworthy to mention that in education level, 42.4% reflected master's degree and master's degree and beyond, while 26.9% were college graduates. This information reflects that the population is assumed to be literate to the extent that they are able to understand and interpret information regarding healthcare such as meeting scheduled appointments, medication regimens for taking medication, confidence in being able to take medication, and arranging traveling for appointments (Morisky, Green, & Levine, 1986; Ogedegbe, Mancuso, Allegrante, & Charlson, 2003). Participants appeared to have mastered the skill to address their needs or are able to ask and seek assistance in obtaining the help that is required to achieve a satisfactory outcome.

Sixty-seven percent indicated that they could not see their medication bill. Reading labels was unable to be achieved by 79%. In other words, the participants required some assistance, either through human and/or technology intervention, to acquire information regarding their medication such as the type of medication, when to take the medication, what medications looked like, how much to take, potential side effects, what to do if medication is missed, when is the medication refilled, etc.

Having access to information regarding one's medication, being able to care for one's self and managing one's care is an important element in healthcare management and quality of life (Jacobs, Hammerman-Rozenberg, Maaravi, Cohen, & Stessman, 2005; Varma, Wu, Chong, Azen, & Hays, 2006). Participants provided their individual responses to open-ended questions regarding coping methods when taking medication. The responses fell into a central theme category of 'organizing medications'. Some level of assistance is still required in this task. Results reflected that the majority of the participants for this question organized their medications in medication containers or other containers, i.e. bottles of different sizes, labeled some, etc. Also, the central theme for the remaining questions fell into the categories of ‘not being able to read the medication labels’, ‘health deterioration’, and ‘voice-over devices’ that provided information to them regarding an item or ‘script-talk device’ that actually read the prescription label and provided other relevant information to the listener.

Even more important to note that a central theme category was ‘health deterioration’ if they missed their medication or did not take their medication. When examining the means of those that follow their prescribed medication regimen (10.71) and the test value (10.33), the results indicated there is no evidence to support that individuals with vision impairments take their medications as prescribed as measured by the ARMS. The taking of medication as prescribed was not statistically significantly different as measured by the ARMS for this study. At the same time, when examining if individuals with vision impairments, refilled their medication on schedule (6.13) and the test value (5.99), the results indicated that there is also no sufficient evidence to support the statement that individuals with vision impairments refill their medication on schedule as measured by the SEAMS. Refilling medication on schedule was not statistically significantly different as measured by the SEAMS.

When examining the mean score for the confidence level of individuals with vision impairments who use assistive technology/aids in taking their medication (27.81) and those that did not (30.19) as measured by the SEAMS with a test for equality variance (1.269) and the test for equality of means (2.385). Results indicated that the confidence level of individuals using assistive technology/aid in taking their medication and the confidence level of those that used no technology in taking their medication showed no statistically significant difference on the SEAMS. However, the difference for those who do use assistance was at the .07 level.

The results for feeling confident in their ability to manage their medication independently were different. The mean score was 29.0 for feeling confident in their ability to manage their medication as measured by SEAMS with a test value of 26. Results indicated that feeling confident in their ability to manage their medication showed a statistical significant difference when measured by the SEAMS. Results show that the evidence support the statement that individuals with vision impairment in the study feel somewhat confident to very confident in their ability to manage their medication as measured by the SEAMS.

Implications

The results of this study indicate several implications. First, the results of this study imply that individuals with vision impairments have challenges in reading the labels on their medication prescription, which also present some challenges in being able to take medication independently and as prescribed. The majority of individuals with vision impairments require some assistance in taking their medication, whether it is from the assistance of other individuals or through assistive technology/aids. In fact, the results provide no evidence to support that individuals with vision impairments follow their prescribed medication regimens and that they refill their medication as scheduled. In addition, the results did no provide evidence to support a difference in the confidence level of individuals with vision impairment who use technology/aids in taking their medications and the confidence level of individuals who do not use assistive technology/aids. However, the majority of individuals in the study indicated that some level of assistance was needed in adhering to their medication regimens. These responses suggest that efforts to enhance accessibility as well as enhance voice-over devices are necessary to help inform this population of their medication needs.

The majority of the population surveyed was adults age 58 to 66 that were responsible for their healthcare management. An impediment to managing one’s health and caring for one’s self medically is having the necessary information as well as having access to information. It is imperative that individuals with vision impairments are able to access information and other necessary health-related information that is also available to sighted individuals. Overall, individuals with vision impairments have challenges in accessing various information regarding medication regimens and other health-related issues.

However, individuals with vision impairments feel ‘somewhat confident’ to ‘very confident’ in their ability to manage their medication as measured by the Self-Efficacy for Appropriate Medication Use Scale (SEAMS). When managing their medical care and/or medication regimens methods that are sufficient to them are incorporated into their repertoire to obtain their desired outcome.

Therefore, one could assume that individuals with vision impairment have some challenges in obtaining their medication and travel, but feel somewhat confident to very confident in their management of their medication. Medication information is not always readily accessible; however, avenues to access that information have been established. They may include such things as use of others and assistive technology/aids. Furthermore, the results indicated that the majority of the participants support their healthcare through various types of medication management. Society must become more inclusive in the medical field for all individuals including those with disabilities seeking medical as well as pharmaceutical services. It is important that service providers realize that it is necessary to incorporate equal access for individuals using different formats to access information. The values of independence, productivity, and inclusion are goals for various service delivery systems. These goals should be used in among all service delivery systems to help individuals with vision impairments and other disabilities to gain access to needed information.

Results imply that individuals with vision impairments require the assistance of others in many tasks that require reading. Even though assistance is provided to them in some manner, they feel somewhat confident to very confident in how they manage their medication. They also feel that they are independent in many aspects in regard to their medication management.

Recommendations

The research for this study focused on the confidence level of individual's with vision impairments in taking their medication as well as if they followed their medication regimens as prescribed. This research further investigated individuals with vision impairments perception of their ability to read medication labels and the use of assistive technology/aids when managing their medication. Research that encompasses a larger population in other states is needed to obtain a representative sample and explore the prevalence and challenges that exist for individuals with vision impairments in taking their medication and following their medication regimens.

The study was designed so that it could be replicated at other organizations and agencies providing services to individuals with vision impairments as well as for other disciplines studying this topic such as medical, pharmacy, rehabilitation, etc. In addition, future research could expand the scope and identify specific methods to address the needs of individuals with vision loss recognizing that vision loss consist of different levels and it must be addressed in many ways. The literature suggests that there are no national requirements established for the format of medication labeling on prescription medication. Currently medication labeling is not acceptable for individuals with vision loss (American Foundation for the Blind [AFB], 2005, 2008b).

In managing one's medication there are also safety issues that must be considered. Vision loss affects one's ability to take medication as prescribed as well as take the correct medication at the right time (AFB, 2005, 2008b; McFeely, 2009). According to AFB, vision loss affects the ability to read labels on prescriptions, and determines shape, color and any markings on medication. Vision loss also affects individuals' ability to see to operate various types of medical devices and requires the assistance of others in managing those devices. These conditions impact the safety and well-being of individuals with vision impairments (AFB, 2008b; NFB, 2004).

Another major point of interest for this sample population was travel. Most of the individuals who responded did not travel outside their home independently. Therefore, in many cases, in order to access medication, participants also required the assistance of others. Transportation can be another area to explore to enhance access to medication independently. How society addresses these issues is important because these issues have a great impact on this population's ability to manage their care. It is important that individuals with vision impairment be informed regarding their medication, because it limits the chance of taking the wrong medication, at the wrong time, and the wrong amount. Safety is a major concern when individuals are not clearly aware of their medications and information regarding the medication (AFB, 2008; McFeely, 2009).

It is important to note that individuals in the study identified coping methods that they used in taking their medications as well as barriers that they feel contribute to their non-adherence to their medication regimen. Having this type of information helps agencies and organizations at the federal, state, and non-profit levels in developing programs and resources that aid in enhancing accessibility for individuals with vision impairments (AFB, 2008b; NFB, 2004).

The findings in this study showed no significant difference in three of the four questions. Individuals with vision impairments efforts in following their medication regimens showed no evidence to support that they followed their medication regimens. We recognize that this is an important factor in taking medication and managing one's medication. Medication is not effective if it is not taken correctly (McFeely, 2009; Osterberg & Blaschke, 2005). It is also necessary for the care and overall functioning of some individuals. It can also be a life or death situation for others (Ho, Bryson, & Rumsfeld, 2009; Ogedegbe, Mancuso, Allegrante, & Charlson, 2003; Osterberg & Blaschke, 2005).

Another area that showed no difference was the refilling of medication on schedule. This area should be further explored and expanded to identify how medication is obtained. Inhibitors should be identified that prevent individuals with vision impairments from obtaining their medications to have it readily available when they need to take it. Does a factor such as transportation influence their ability to have on-hand medication when they need to take it? What is the current trend for this population in accessing their medication? How are they able to refill their medication? How are individuals with vision impairments able to access their necessary medication, and the side effects, instructions, etc.?

The confidence level of those individuals who use assistive technology/aids to take their medication and those who do not use assistive technology to take their medication also showed no difference. Assistive technology has been considered the equalizer that afforded individuals with disabilities such as individuals with vision impairments the opportunity to be independent in taking their medication. Assistive technology is considered an equalizer for many individuals with disabilities. Exploring avenues to meet the needs of individual with vision impairments through assistive technology is also necessary for these items to be accessible and affordable to individuals that need them.

The results indicated that individuals with vision impairment have challenges in being able to take their medication, following their medication regimen, and refilling their medication. Also in this study, there was no evidence to support a difference in the confidence level of users and non-users of assistive technology/aids. In spite of the challenges individuals with vision impairments had in the study, they felt confident in their ability to manage their medication independently. The results showed a statistically significant difference.

Further research in this area also should be explored to determine what specific elements make an individual feel confident in taking their medication and what specific influence it has on individuals with vision impairments taking medication. How can those elements be shared or transferred to other populations of individuals with vision impairments that have similar challenges?

Summary

The focus of this study was self-efficacy and medication adherence of individuals with vision impairment. The focus was further delineated by investigating the confidence level of individuals with vision impairments associated with tasks such as ability to read medication labels, ability to take medications as prescribed, and use of assistive technology. Participants represented at least one of the three non-profit, advocacy organizations in the State of Georgia. The results of the study indicated that individuals with vision impairments feel ‘somewhat’ ‘confident’ to ‘confident’ in their ability to manage their medications independently.

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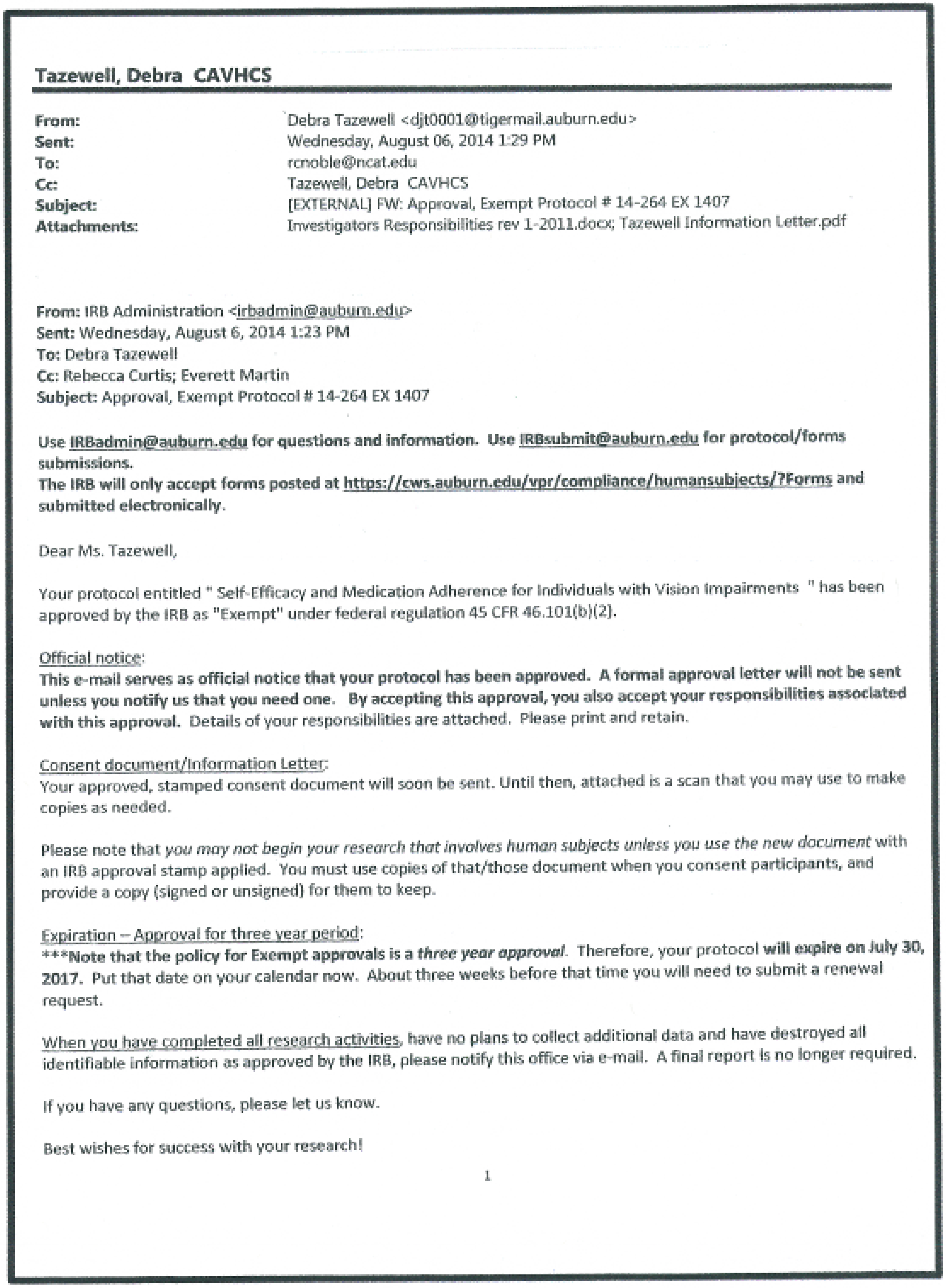
Appendix A

IRB APPROVAL NOTIFICATION FROM AUBURN UNIVERSITY



Tazewell, Debra CAVHCS

From:	Debra Tazewell <djt0001@tigermail.auburn.edu>
Sent:	Wednesday, August 06, 2014 1:29 PM
To:	rcnoble@ncat.edu
Cc:	Tazewell, Debra CAVHCS
Subject:	[EXTERNAL] FW: Approval, Exempt Protocol # 14-264 EX 1407
Attachments:	Investigators Responsibilities rev 1-2011.docx; Tazewell Information Letter.pdf

From: IRB Administration <irbadmin@auburn.edu>
Sent: Wednesday, August 6, 2014 1:23 PM
To: Debra Tazewell
Cc: Rebecca Curtis; Everett Martin
Subject: Approval, Exempt Protocol # 14-264 EX 1407

Use IRBadmin@auburn.edu for questions and information. Use IRBsubmit@auburn.edu for protocol/forms submissions.
The IRB will only accept forms posted at https://cws.auburn.edu/vpr/compliance/humansubjects/?Forms and submitted electronically.

Dear Ms. Tazewell,

Your protocol entitled " Self-Efficacy and Medication Adherence for Individuals with Vision Impairments " has been approved by the IRB as "Exempt" under federal regulation 45 CFR 46.101(b)(2).

Official notice:
This e-mail serves as official notice that your protocol has been approved. A formal approval letter will not be sent unless you notify us that you need one. By accepting this approval, you also accept your responsibilities associated with this approval. Details of your responsibilities are attached. Please print and retain.

Consent document/Information Letter:
Your approved, stamped consent document will soon be sent. Until then, attached is a scan that you may use to make copies as needed.

Please note that *you may not begin your research that involves human subjects unless you use the new document* with an IRB approval stamp applied. You must use copies of that/those document when you consent participants, and provide a copy (signed or unsigned) for them to keep.

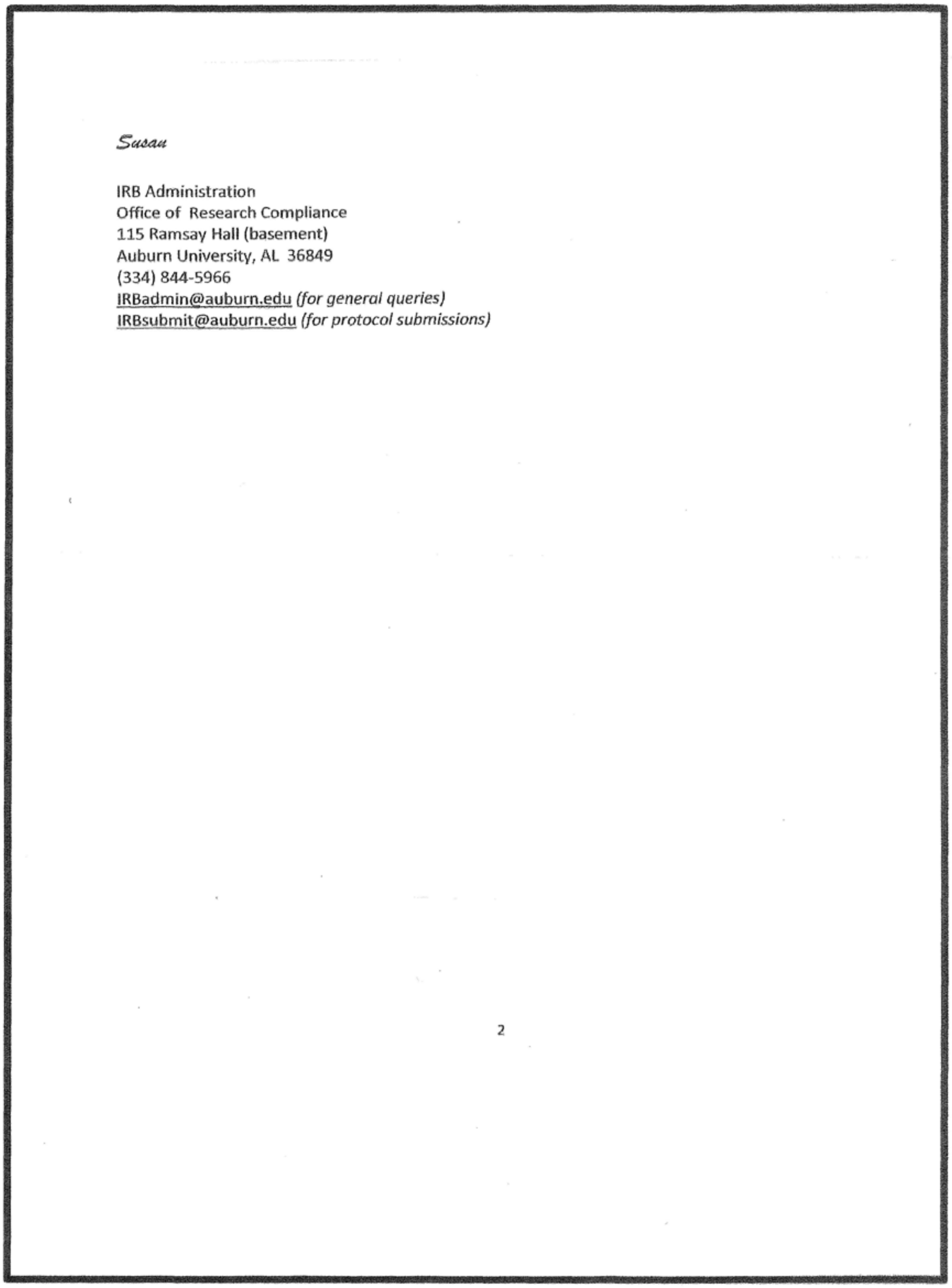
Expiration – Approval for three year period:
*****Note that the policy for Exempt approvals is a *three year approval*.** Therefore, your protocol **will expire on July 30, 2017.** Put that date on your calendar now. About three weeks before that time you will need to submit a renewal request.

When you have completed all research activities, have no plans to collect additional data and have destroyed all identifiable information as approved by the IRB, please notify this office via e-mail. A final report is no longer required.

If you have any questions, please let us know.

Best wishes for success with your research!

1

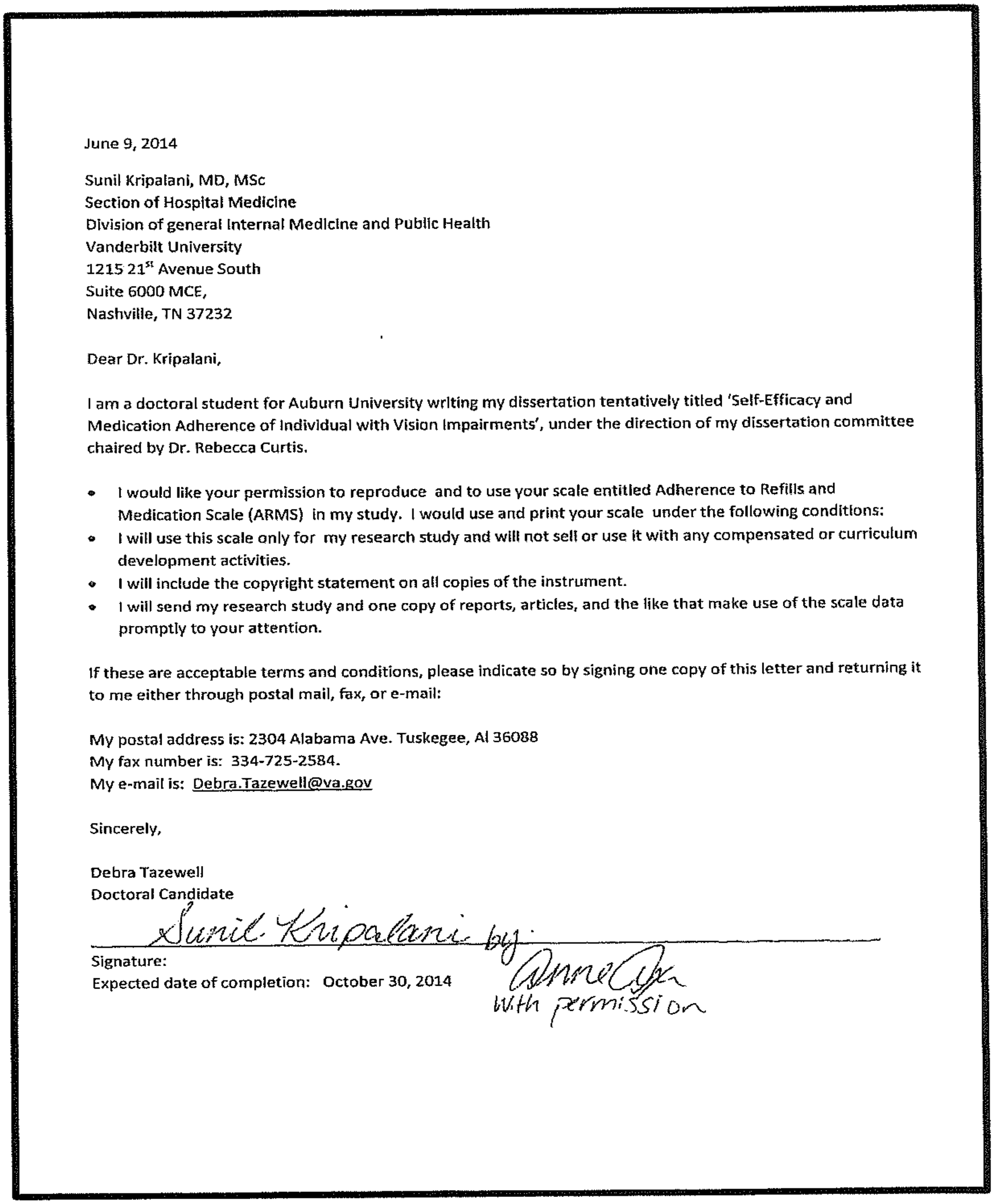


Susan

IRB Administration
Office of Research Compliance
115 Ramsay Hall (basement)
Auburn University, AL 36849
(334) 844-5966
IRBadmin@auburn.edu *(for general queries)*
IRBsubmit@auburn.edu *(for protocol submissions)*

APPENDIX B

LETTER OF PERMISSION TO USE ARMS



June 9, 2014

Sunil Kripalani, MD, MSc
Section of Hospital Medicine
Division of general Internal Medicine and Public Health
Vanderbilt University
1215 21st Avenue South
Suite 6000 MCE,
Nashville, TN 37232

Dear Dr. Kripalani,

I am a doctoral student for Auburn University writing my dissertation tentatively titled 'Self-Efficacy and Medication Adherence of Individual with Vision Impairments', under the direction of my dissertation committee chaired by Dr. Rebecca Curtis.

- I would like your permission to reproduce and to use your scale entitled Adherence to Refills and Medication Scale (ARMS) in my study. I would use and print your scale under the following conditions:
- I will use this scale only for my research study and will not sell or use it with any compensated or curriculum development activities.
- I will include the copyright statement on all copies of the instrument.
- I will send my research study and one copy of reports, articles, and the like that make use of the scale data promptly to your attention.

If these are acceptable terms and conditions, please indicate so by signing one copy of this letter and returning it to me either through postal mail, fax, or e-mail:

My postal address is: 2304 Alabama Ave. Tuskegee, Al 36088
My fax number is: 334-725-2584.
My e-mail is: Debra.Tazewell@va.gov

Sincerely,

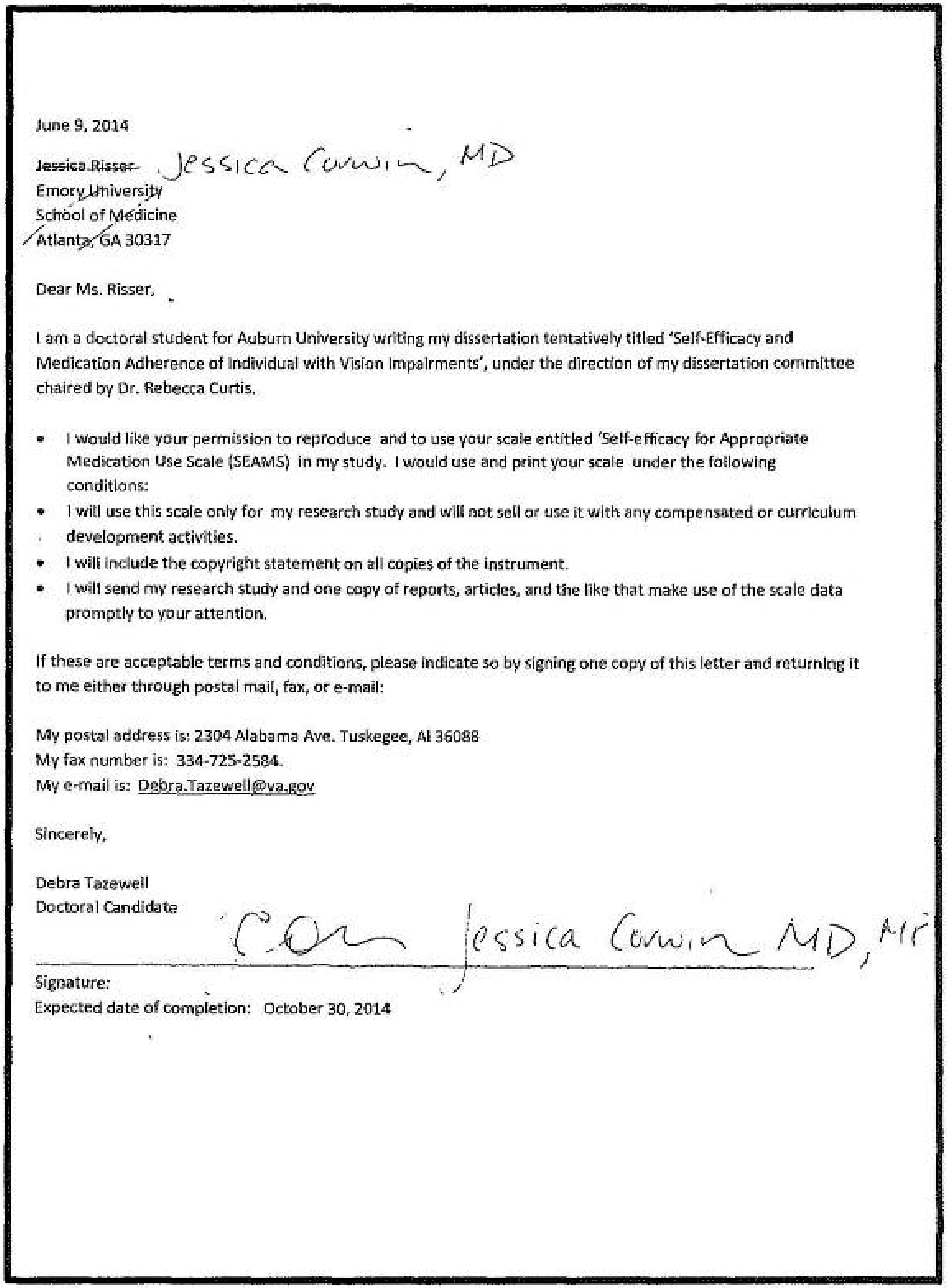
Debra Tazewell
Doctoral Candidate

Sunil Kripalani by:
Signature:
Expected date of completion: October 30, 2014

with permission

APPENDIX C

LETTER OF PERMISSION TO USE SEAMS



June 9, 2014

~~Jessica Risser~~ Jessica Corwin, MD
Emory University
School of Medicine
Atlanta, GA 30317

Dear Ms. Risser,

I am a doctoral student for Auburn University writing my dissertation tentatively titled 'Self-Efficacy and Medication Adherence of Individual with Vision Impairments', under the direction of my dissertation committee chaired by Dr. Rebecca Curtis.

- I would like your permission to reproduce and to use your scale entitled 'Self-efficacy for Appropriate Medication Use Scale (SEAMS) in my study. I would use and print your scale under the following conditions:
- I will use this scale only for my research study and will not sell or use it with any compensated or curriculum development activities.
- I will include the copyright statement on all copies of the instrument.
- I will send my research study and one copy of reports, articles, and the like that make use of the scale data promptly to your attention.

If these are acceptable terms and conditions, please indicate so by signing one copy of this letter and returning it to me either through postal mail, fax, or e-mail:

My postal address is: 2304 Alabama Ave. Tuskegee, Al 36088
My fax number is: 334-725-2584.
My e-mail is: Debra.Tazewell@va.gov

Sincerely,

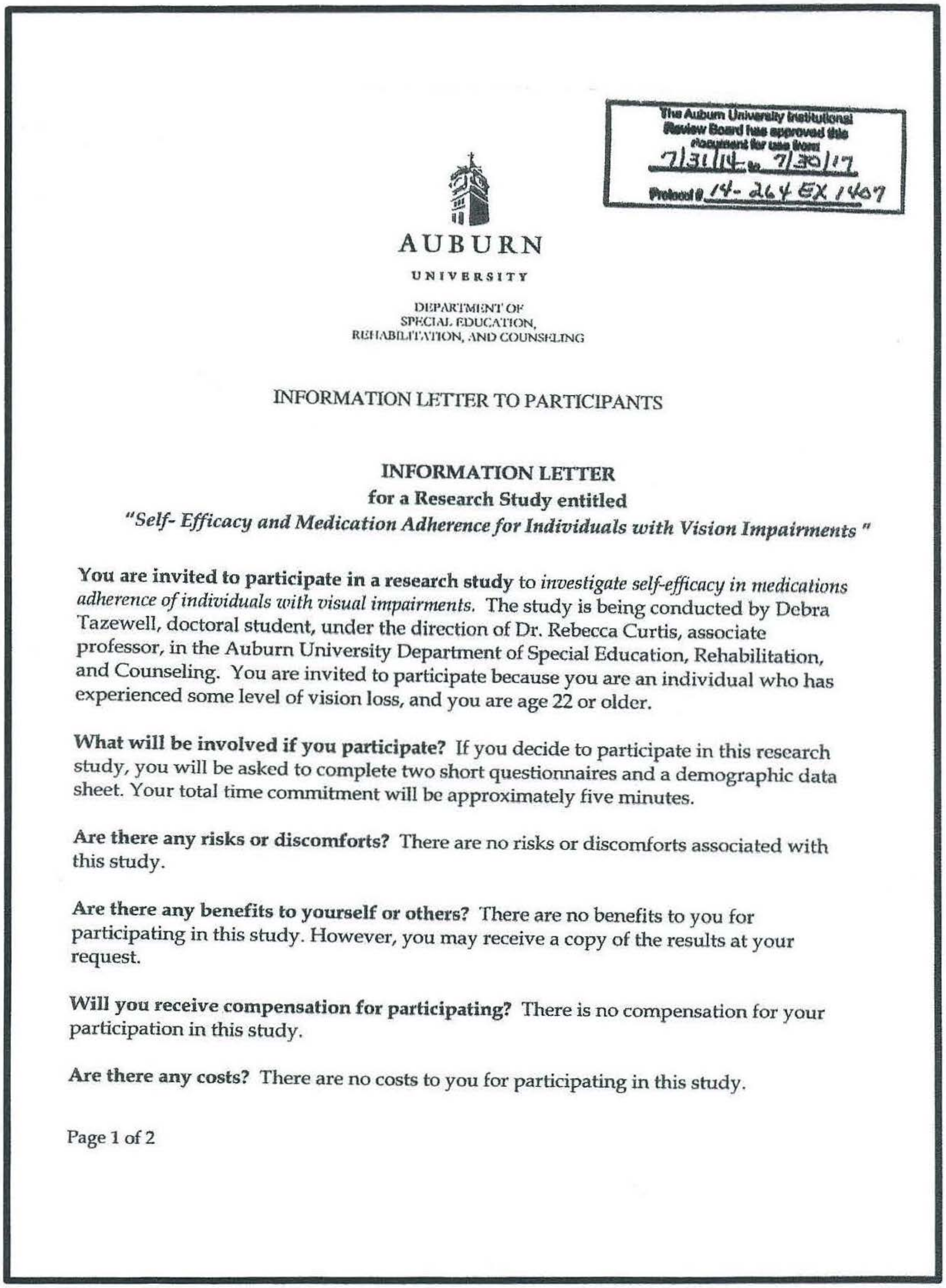
Debra Tazewell
Doctoral Candidate

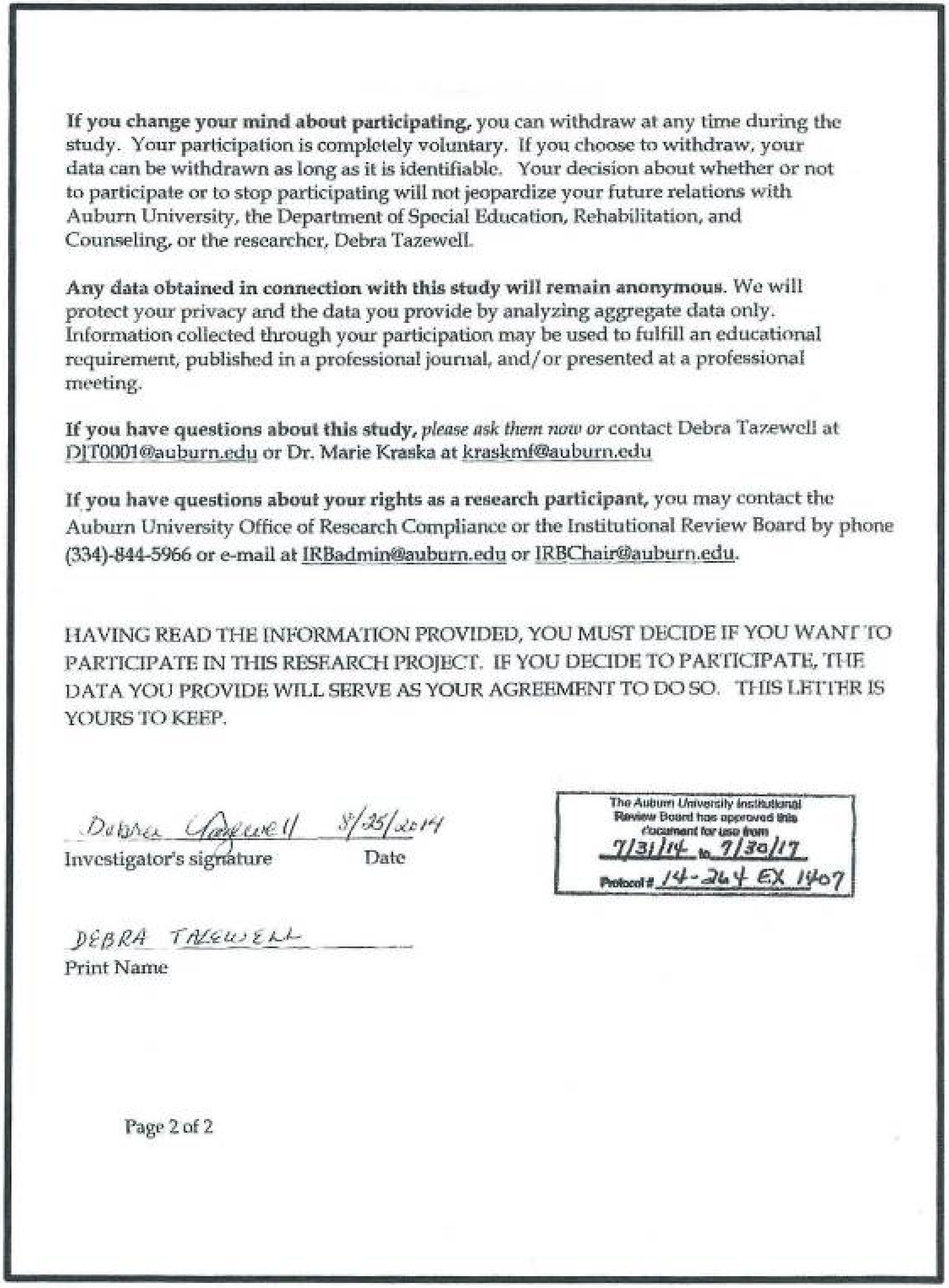
Jessica Corwin MD, MP

Signature:
Expected date of completion: October 30, 2014

APPENDIX D

INFORMATION LETTER TO PARTICIPANTS





If you change your mind about participating, you can withdraw at any time during the study. Your participation is completely voluntary. If you choose to withdraw, your data can be withdrawn as long as it is identifiable. Your decision about whether or not to participate or to stop participating will not jeopardize your future relations with Auburn University, the Department of Special Education, Rehabilitation, and Counseling, or the researcher, Debra Tazewell.

Any data obtained in connection with this study will remain anonymous. We will protect your privacy and the data you provide by analyzing aggregate data only. Information collected through your participation may be used to fulfill an educational requirement, published in a professional journal, and/or presented at a professional meeting.

If you have questions about this study, *please ask them now or* contact Debra Tazewell at DJT0001@auburn.edu or Dr. Marie Kraska at kraskmf@auburn.edu

If you have questions about your rights as a research participant, you may contact the Auburn University Office of Research Compliance or the Institutional Review Board by phone (334)-844-5966 or e-mail at IRBadmin@auburn.edu or IRBChair@auburn.edu.

HAVING READ THE INFORMATION PROVIDED, YOU MUST DECIDE IF YOU WANT TO PARTICIPATE IN THIS RESEARCH PROJECT. IF YOU DECIDE TO PARTICIPATE, THE DATA YOU PROVIDE WILL SERVE AS YOUR AGREEMENT TO DO SO. THIS LETTER IS YOURS TO KEEP.

Debra Tazewell 8/25/2014
Investigator's signature Date

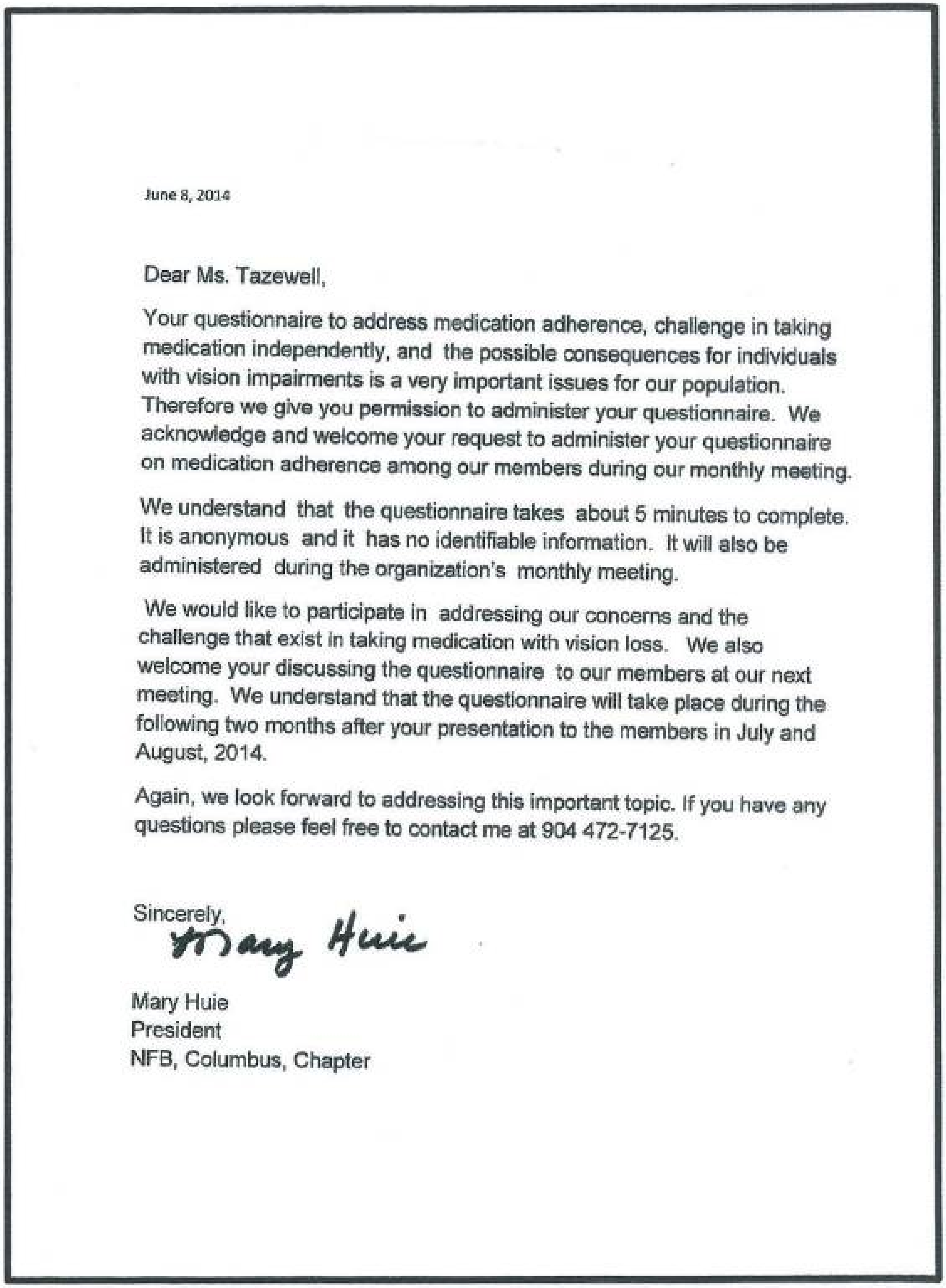
DEBRA TAZEWELL
Print Name

The Auburn University Institutional
Review Board has approved this
document for use from
7/31/14 to 7/30/17
Protocol # 14-264 EX 1407

Page 2 of 2

APPENDIX E

PERMISSION LETTER FROM NFB



June 8, 2014

Dear Ms. Tazewell,

Your questionnaire to address medication adherence, challenge in taking medication independently, and the possible consequences for individuals with vision impairments is a very important issues for our population. Therefore we give you permission to administer your questionnaire. We acknowledge and welcome your request to administer your questionnaire on medication adherence among our members during our monthly meeting.

We understand that the questionnaire takes about 5 minutes to complete. It is anonymous and it has no identifiable information. It will also be administered during the organization's monthly meeting.

We would like to participate in addressing our concerns and the challenge that exist in taking medication with vision loss. We also welcome your discussing the questionnaire to our members at our next meeting. We understand that the questionnaire will take place during the following two months after your presentation to the members in July and August, 2014.

Again, we look forward to addressing this important topic. If you have any questions please feel free to contact me at 904 472-7125.

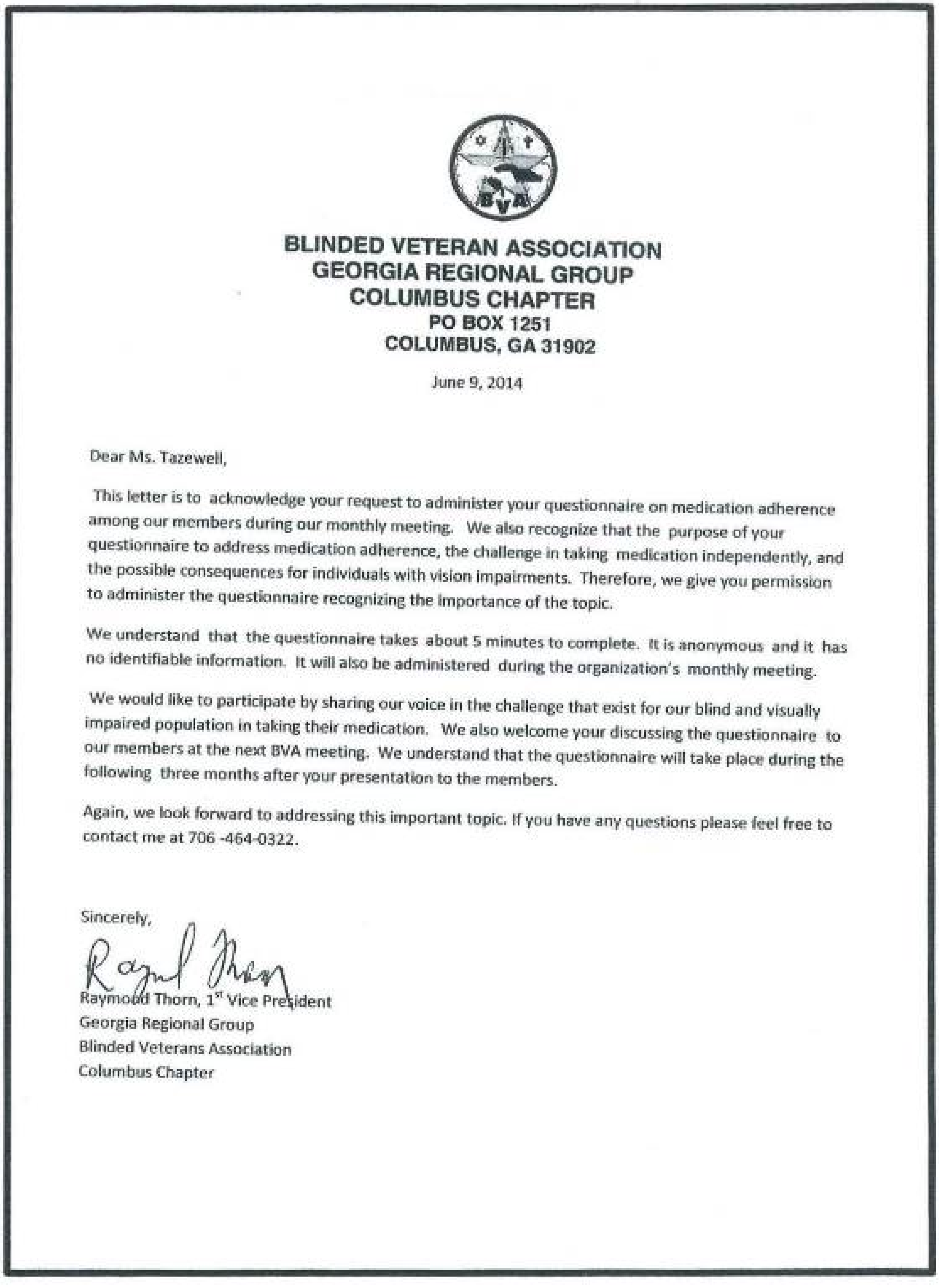
Sincerely,

Mary Huie

Mary Huie
President
NFB, Columbus, Chapter

APPENDIX F

PERMISSION LETTER FROM THE BVAGRG



BLINDED VETERAN ASSOCIATION
GEORGIA REGIONAL GROUP
COLUMBUS CHAPTER
PO BOX 1251
COLUMBUS, GA 31902

June 9, 2014

Dear Ms. Tazewell,

This letter is to acknowledge your request to administer your questionnaire on medication adherence among our members during our monthly meeting. We also recognize that the purpose of your questionnaire to address medication adherence, the challenge in taking medication independently, and the possible consequences for individuals with vision impairments. Therefore, we give you permission to administer the questionnaire recognizing the importance of the topic.

We understand that the questionnaire takes about 5 minutes to complete. It is anonymous and it has no identifiable information. It will also be administered during the organization's monthly meeting.

We would like to participate by sharing our voice in the challenge that exist for our blind and visually impaired population in taking their medication. We also welcome your discussing the questionnaire to our members at the next BVA meeting. We understand that the questionnaire will take place during the following three months after your presentation to the members.

Again, we look forward to addressing this important topic. If you have any questions please feel free to contact me at 706 -464-0322.

Sincerely,

Raymond Thorn, 1st Vice President
Georgia Regional Group
Blinded Veterans Association
Columbus Chapter

APPENDIX G

PERMISSION LETTER FROM GCB

Georgia Council of the Blind
GCB
Growing, Changing, Building

July 7, 2014

Dear Ms. Tazewell,

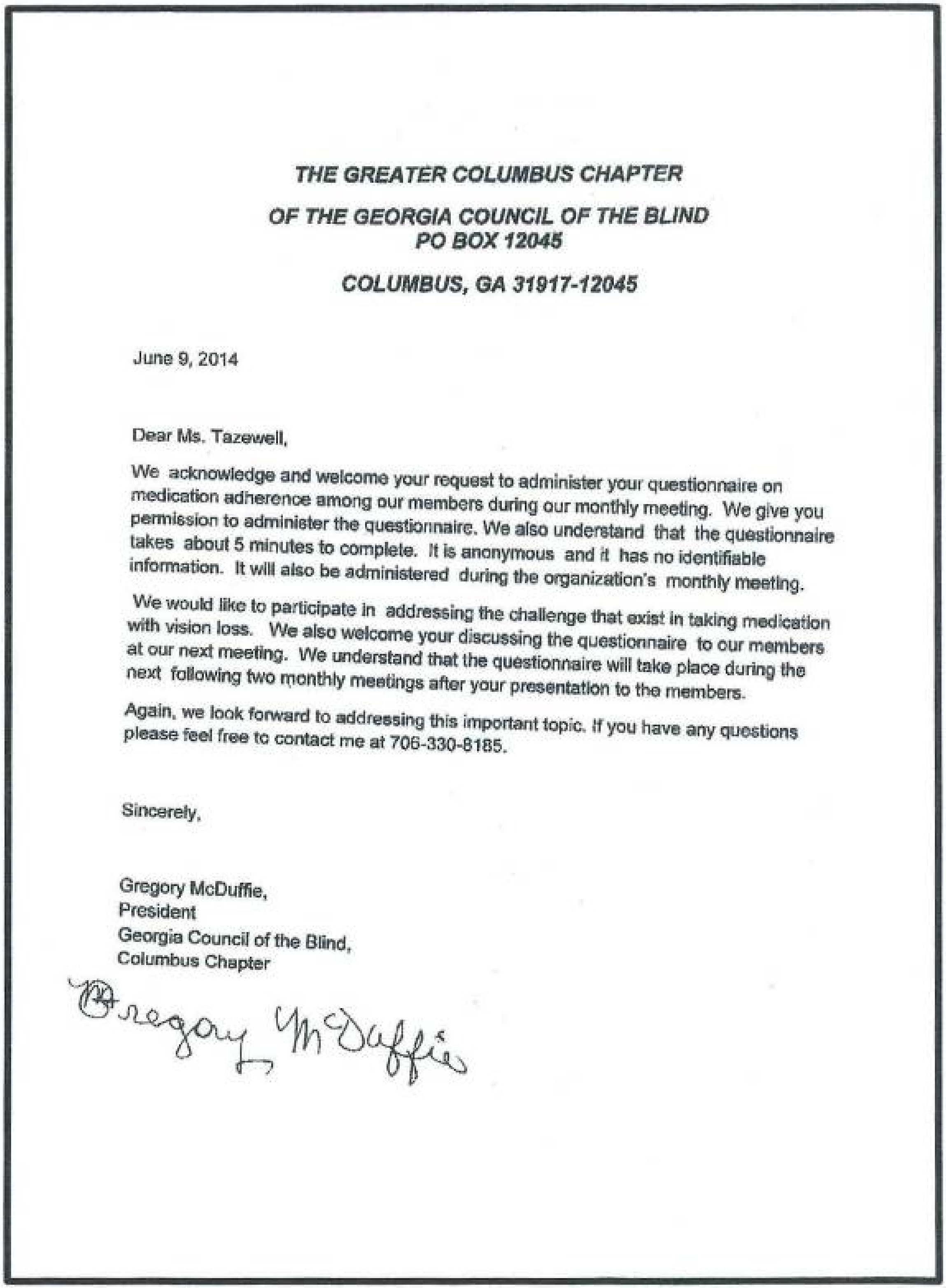
The project that you are working on entitled "Self Efficacy and Medication Adherence for individuals with Vision impairment" is a topic that is very important that needs addressing among our members and all individuals with vision loss.

This is a topic that many of our members are struggling with in being able to manage their medications and take their medications independently. We welcome the opportunity to participate in this project by completing the questionnaires. We also realize that the questionnaires are anonymous and there is no identifying information. The questionnaire will be provided to each member that wishes to volunteer to participate with their proxy or another identified proxy. The completed questionnaires will be placed in a drop box provided by you. We understand that the questionnaires will take approximately 5 minutes to complete. We plan to meet in the month of August and welcome you to administer the questionnaires at that time.

We are looking forward to a copy of the results to aid us in our advocacy role in addressing the needs of individuals with vision loss in managing their medications.

Sincerely,

Bill Holley
President, Georgia Council of the Blind



THE GREATER COLUMBUS CHAPTER

OF THE GEORGIA COUNCIL OF THE BLIND
PO BOX 12045

COLUMBUS, GA 31917-12045

June 9, 2014

Dear Ms. Tazewell,

We acknowledge and welcome your request to administer your questionnaire on medication adherence among our members during our monthly meeting. We give you permission to administer the questionnaire. We also understand that the questionnaire takes about 5 minutes to complete. It is anonymous and it has no identifiable information. It will also be administered during the organization's monthly meeting.

We would like to participate in addressing the challenge that exist in taking medication with vision loss. We also welcome your discussing the questionnaire to our members at our next meeting. We understand that the questionnaire will take place during the next following two monthly meetings after your presentation to the members.

Again, we look forward to addressing this important topic. If you have any questions please feel free to contact me at 706-330-8185.

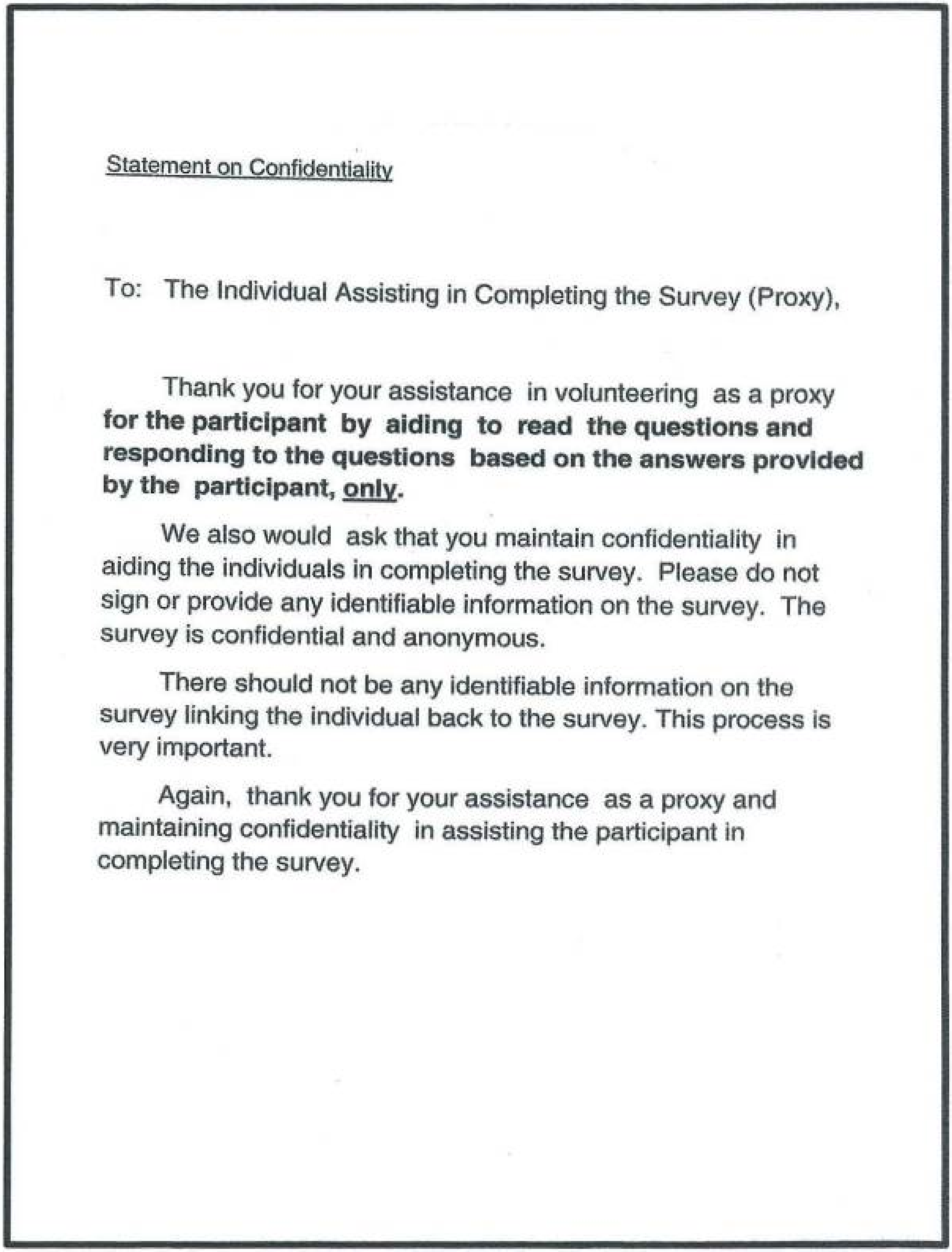
Sincerely,

Gregory McDuffie,
President
Georgia Council of the Blind,
Columbus Chapter

Gregory McDuffie

APPENDIX H

STATEMENT ON CONFIDENTIALITY



Statement on Confidentiality

To: The Individual Assisting in Completing the Survey (Proxy),

Thank you for your assistance in volunteering as a proxy **for the participant by aiding to read the questions and responding to the questions based on the answers provided by the participant, only.**

We also would ask that you maintain confidentiality in aiding the individuals in completing the survey. Please do not sign or provide any identifiable information on the survey. The survey is confidential and anonymous.

There should not be any identifiable information on the survey linking the individual back to the survey. This process is very important.

Again, thank you for your assistance as a proxy and maintaining confidentiality in assisting the participant in completing the survey.