

ASSESSMENT OF COMMUNITY FALL PREVENTION TOOLKIT

A Thesis by
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The following faculty members have examined the final copy of this thesis for form and content, and recommend that it be accepted in partial fulfillment of the requirement for the degree of Master of Arts with a major in Aging Studies.

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ABSTRACT

Falls are the leading cause of injury among adults age 65 years and older. Falls in older adults result in physical disability, emotional distress, and financial burdens. Risk factors for falls include: poor vision, polypharmacy, home safety hazards, and lack of strength and balance. Strategic plans have been proposed to reduce risk factors. The Centers for Disease Control and the National Council of Aging recommend routine vision exams, medication reviews, home safety evaluations, and routine exercise. Based on these guidelines, the Wichita State University Regional Institute on Aging Falling LinKS research group developed a toolkit to be used independently by older adults to reduce their risk of falling. However, providing older adults with a well-designed product does not ensure its use. The purpose of this study was to evaluate a locally developed toolkit, *Falling Less in Kansas*; to determine if it is easy to use and is satisfying to the user. We also inquired about preferential venues of distribution for the toolkit. Four focus group sessions, recruited from two urban organizations and two rural health clinics, were conducted. In addition, six older adults from a rural community participated in a usability test to determine the ease of use of the toolkit. Although the participants felt the toolkit was attractive, well organized, and easy to use, they thought it may contain too much information. Interestingly, the majority of participants admitted they would not actively use the toolkit on their own, but would need it introduced to them by a health care provider (primary care provider or pharmacist) or in a social setting.

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CHAPTER 1

INTRODUCTION AND LITERATURE REVIEW

Falls are the leading cause of injury among adults aged 65 years and older in the US (CDC) and the leading cause of injury death among this age group (CDC). Almost two million older adults are treated each year in the emergency room due to injuries from falls (CDC). The frequent use of antiplatelets/anticoagulants increases the seriousness of their injury. Twenty to thirty percent of those who fall will suffer a moderate to severe injury (ATS), making mobility difficult. Of those who fall, 12.5% of men and 27.3% of the women suffer injuries; 8% suffer major injuries, while 49% suffer minor injuries (Melzer, 2009). Falls cause 90% of hip fractures in older adults, and cost the US approximately 10 billion dollars annually (Carter, 2001). In addition, traumatic brain injuries, a major cause of morbidity and mortality in older adults, often result from falls (Gangavati, 2009). Although many falls do not result in death, many significant and adverse consequences result from these events. Falls can lead to increased pain, disability, and functional impairment. One quarter of falls restrict activity either due to the injury itself or the fear it places on the individual (Kempton, 2000). Moreover, older adults are often unable to return to independent living immediately after an injurious fall. Not only do falls affect the quality and quantity of life of an older adult, but they are very costly (Carrol, 2005). Reducing fall risk factors can help reduce direct healthcare costs and the disabilities associated with a fall. Evidence-based fall prevention interventions and strategies have been recommended by national agencies; however, widespread implementation has been less than optimal for a variety of reasons (Chou, 2006; Tinetti, 2008). Fall prevention interventions are only as good as participants allow. The purpose of this study is to evaluate the usability, satisfaction and preferred venues of distribution of older adults regarding a previously developed, fall prevention toolkit, designed for use by individuals in their homes.

1.1 Risk Factors for Fall

Both intrinsic (those related to the individual) and extrinsic (those related to the environment) risk factors contribute to falls in older adults (Ruddock, 2004). According to the American Geriatric Society, fall risk factors include: previous falls, polypharmacy, cognitive impairment, impaired vision, gait deficit, impaired balance, muscle weakness, and unfavorable environment (AGS, 2001). A systematic review of 21 studies conducted in Chinese older adults revealed over 130 risk factors for falls. The most common reasons for falls, in descending order, were: sex (females > males), decline in activities of daily living, multiple medications, increasing age, fear of falling, use of walking aid, self-perceived poor health, marital status, diabetes, and others (Kwan, 2011). Psychological factors,

such as fear, depression, anxiety, low self-confidence and social isolation can also increase the risk of falling (Means, 2003). Fall risk increases with an increasing number of risk factors. To reduce risk factors, a change in behavior is often necessary.

1.2 Reducing Fall Risk

Changing behavior to reduce fall risk factors requires people to actually believe they are at risk for falling, understand behavior that increases risk of falling, and believe changing behavior will reduce risk. There are several theories on influencing behavior change, including the health belief model (Geilen, 2003). The health belief model, a common theory in health education and promotion, is based on personal beliefs and perceptions influencing health behaviors. The main constructs of this model include: perceived seriousness of the disease, perceived susceptibility to acquire the disease, perceived benefits of changing behavior, and perceived barriers of changing the behavior (Hayden, 2009). Understanding behavior change assists in determining why intervention programs succeed or fail, and provides guidance in building successful prevention programs.

1.3 Fall Prevention Strategies

Participation in fall prevention programs may help reduce fall risk (Salminen, 2009 & Diener, 2005). Benefits of programs include increasing independence, enjoyment, and gaining confidence (Evron, 2009). The advantages of single intervention over multifactorial programs are cost-effectiveness, less confusion, less time-consuming and less resource intensiveness (Rose, 2008). A 10-30% reduction in risk can occur with utilization of multifactorial fall prevention programs (Gillespie, 2003 & Chang, 2004). Many programs suggest increasing exercise, while others add reviewing medications, and performing safe behaviors (Butois, 2010). The Center for Disease Control (CDC) has made several recommendations to help prevent falls in older adults, including: routine vision exams, health care provider oriented medication reviews, home safety evaluations and regular exercise. The following outlines information related to the CDC's recommendations.

1. Medication review and modification

Polypharmacy, taking more than four medications per day, increases fall risk (AGS). In addition to polypharmacy, specific drug classifications increase risk of falling: anticonvulsants, antidepressants, antipsychotic/neuroleptics, benzodiazepines, some antiarrhythmics, narcotic analgesics, and sedative/hypnotics (Kelly, 2003 & Ruddock, 2004). Adverse effects of medications that contribute to falls include: agitation, arrhythmias, confusion, dizziness, gait abnormalities, sedation, syncope, and

visual disturbances (Ruddock, 2004). The higher number of prescription and over-the-counter medications a person takes, the higher the risk of synergistic adverse effects of the medications.

Despite polypharmacy exposure increasing falls in older adults, PCPs are hesitant to reduce or eliminate risky medications. Prescribing high risk medications in older adults is actually higher after a hip fracture related to a fall than before the fall (Kragh, 2011). There are many tools that may be utilized by PCPs to assist in medication review. Some of these include: “START” (Screening Tool to Alert doctors to the Right Treatment) and “STOP” (Screening Tool of Older Person’s potentially inappropriate Prescriptions) and the ARMOR (Assess, Review, Minimize, Optimize, and Reassess) tool (Haque, 2009). Avoiding medications on the Beers criteria, a list of potentially dangerous medications that should generally be avoided in older adults, can also be used to detect and eliminate potentially dangerous drugs (Zhan, 2012). Although older adults may benefit from requesting PCPs to review this list, many general practitioners are not likely to make medication changes to help reduce falls in their patients (Beer, 2006). If maintenance of these medications is necessary, decreasing doses may reduce fall risk (Ruddock, 2004).

2. Vision

Poor vision impacts fall risk. As people age, they have decreased depth perception and contrast sensitivity, which prevents them from detecting obstacles and increases the risk for falls and subsequent fractures. Binocular visual field loss is associated with hip and nonspine, nonhip fractures from falls. Low vision increases significantly in the older adult population. Therefore, older adults should be screened for visual field abnormalities (Coleman, 2009).

3. Home safety evaluation and modification.

There are many potential hazards in and around the outside of the home that increase the susceptibility to falling. Research indicates that home hazards are widespread throughout the homes of older adults and may be even more prevalent in the homes of the frail elderly (Gill, 1999). However, convincing older adults to make changes in their home can be challenging. Reducing home hazards is most advantageous to older adults that have already experienced a fall and have mobility limitations (Lord, 2006).

4. Regular physical activity and balance training

Exercise provides many benefits to older adults. An exercise intervention can help reduce intrinsic risk factors for falling by maintaining functional status and controlling many medical diseases, including: diabetes, cardiovascular disease, and osteoporosis. Exercise increases balance, strength, awareness and reaction times (Hutton, 2009). It increases the ability to participate successfully in the activities of daily living (Rose, 2008). Tai chi, an ancient Chinese martial art form that emphasizes slow, graceful and precise body movements, is an alternative form of exercise used to reduce falls in the older population. Effects of Tai Chi are to improve balance, muscle strength and flexibility (Harling, 2008). Although the evidence is weak for Tai Chi reducing incidence of fall, there is strong evidence that it reduces the fear of falling (Harling, 2008 & Costello, 2008).

Exercise has been shown to reduce falls from both a physiological and psychological standpoint. Physiological improvement is due to endorphin release (Means, 2003). When examining the relationship between psychosocial factors, functional balance, and mobility, an exercise program positively affected fallers compared to nonfallers (Means, 2003). Psychological benefit includes self-efficacy, mastery, and social interaction. Fallers that participate in exercise have less depression, and overall improved health compared to the nonfallers. Non-pharmacological treatment, in the form of exercise, for depression and anxiety keeps these elderly people off antidepressants and anti-anxiety medications, which may actually increase the risk of falls (Means, 2003). These results can be very beneficial for multiple reasons. Exercise improves social interaction and enjoyment, and evokes feelings of achievement, increases alertness, and develops confidence. Many older adults remark that health professionals should do more to encourage physical activity (Hutton, 2009).

Education for older adults is also an intervention and an important initial step. A previously conducted qualitative focus group study of older adults' experiences and perceptions of specific advice about falling prevention revealed that most participants had never received any communication regarding fall prevention. Participants perceived fall prevention solely to mean hazard reduction, limiting activities and slowing down (Yardley, 2006). A trauma program in Michigan reinforces the importance of education after finding a significant improvement in behavior and awareness following an informational session on fall prevention strategies (Koestner, 2009). Education can be provided by many methods, including booklets or digital video disc (DVD). When hospitalized patients were given information regarding risk of falls, fall-related injuries that may occur, and fall prevention

strategies, DVD education showed superiority over a workbook in modifying patients' perceptions, beliefs, and knowledge (Hill, 2009). Educational materials, in various forms, should be dispersed among older adults to reduce falls.

1.4 The Falling LinKS Toolkit

Based on the strategies recommended by the CDC and National Council on Aging (NCOA), a collaborative research group, the Wichita State University Regional Institute on Aging Falling LinKS Research Group, designed a fall prevention toolkit to provide education and fall prevention strategies and tools for older adults. The research group utilized an iterative, community-based participatory process to develop their toolkit designed to help older adults initiate low cost, fall prevention strategies on their own, without the assistance of a healthcare provider (Radebaugh, 2011). The Toolkit contains four major sections addressing the risk factors identified by CDC and NCOA:

1. Medication review and modification. The major focus of this section is to provide information about medication usage and to empower older adults to take control of and understand some of the unexpected effects of medication usage. The *Falling LinKS* Toolkit provides information on talking with a health care provider about medications and reviewing one's own medication usage, tracking medication usage through the "File of Life" and "Vial of Life," and taking and storing medications safely.
2. Vision. The *Falling LinKS* Toolkit includes a number of resources to help identify and screen for vision problems. The Amsler Grid, a tool for home monitoring of vision, and the Functional Screen Questionnaire (FVSQ), a tool to help one decide if you have a vision problem, are both included. (Clemons, 2003). The FVSQ contains 15 questions and a score of 9 or more indicates an examination by a low vision eye doctor or ophthalmologist is needed. A low vision tip sheet offering simple strategies for enhancing personal safety, reducing fall risk, and recommending how to seek help for orientation and mobility problems are included. Because environmental modifications are often prescribed following a low vision evaluation, the home assessment is a critical component of fall education and prevention for *Falling LinKS* Toolkit users with low vision.
3. Home safety evaluation and modification. The *Falling LinKS* Toolkit provides instructions on how to assess the home environment for safety hazards that may increase the risk of falling and makes specific

recommendations for how to modify each identified hazard. A list of home modification tips is included; modification costs range from little to no cost (e.g., remove throw rugs and reduce clutter) to moderate cost (e.g., install handrails in bathrooms or ceiling lights where needed) to significant cost (for example, install walk-in showers that are easy to enter and exit). This section concludes with “My Home Safety Plan,” a document for recording identified hazards and a timeline for the modification.

4. Regular physical activity and balance training. The *Falling LinkS* Toolkit uses the *First Step to Active Health (FSAH™)* program for this section as it is flexible and evidence-based. *FSAH™* progresses through the four components of fitness (i.e., aerobic, flexibility, strength, and balance) in a step-by-step progression (Page, 2004).

The Toolkit was targeted to a 5th grade reading level with specific attention paid to font size and style and appropriate use of photos, color and contrast, organization, and general readability. The Toolkit opens with an introduction including a few common fall scenarios, a section about how to use the Toolkit, and a fall risk assessment tool. The Toolkit concludes with an action plan worksheet (WSU RIA).

1.5 Toolkit Usability

There are several goals in assessing usability of a product: usefulness, effectiveness, learnability, and attitude (likability). Usefulness includes the degree to which the user can achieve the goals of the product and the user’s motivation to use the product. Users must feel the product is worth the benefit that will be gained from using it (Rubin, 1994). The second element is effectiveness, or ease of use. For a product to be “easy to use,” it must not take too much time, the number of steps should be appropriate, and users must be successful in performing the tasks (Dumas, 1999). Ease of use is determined by the speed of performance or error rate. Effectiveness is also determined by the likelihood of the toolkit to be used. The third element is learnability which defines the user’s ability to perform the tasks. The final element is attitude (or likability) which refers to the user’s opinions of the product. People are more likely to use a product that meets their satisfaction level and in which they can perform well (Rubin, 1994).

There are several ways to assess the usability of an end product. Actual usability testing employs techniques to collect data from end users as they perform representative tasks to identify the usability deficiencies of a product. The participants follow explicit guidelines to ensure effectiveness of the design (Rubin 1994). Observations of performance are made and comments regarding tasks are recorded (Dumas 1999). Focus group

research utilizes several participants to obtain opinions and attitudes about a product. It does not allow for evaluation of behaviors towards the product (Dumas 1999). A survey can also be completed, but does not go as in depth as a focus group, or get explanations of rationale of opinions. The satisfaction with the *Falling LinkS* Toolkit, the willingness to use it, and the ease of its use has not been assessed.

1.6 Study Purpose

Fall prevention interventions are only as good as participants allow. The purpose of this study was to evaluate the *Falling Less in Kansas* toolkit; to determine the usability (usefulness, effectiveness, learnability, and attitude (likability) of the Toolkit, if it is satisfying to the user, and its preferred venues of distribution.

CHAPTER 2

METHODOLOGY

This qualitative study was designed to evaluate a previously developed toolkit, *Falling Less in Kansas*. The protocol was approved by the Wichita State University Institutional Review Board. Older adults were recruited to evaluate the toolkit by eliciting their opinions of the toolkit and having them perform the tasks described in the toolkit. This study brought an end product to urban and rural older adults to evaluate the satisfaction and ease of its use.

2.1 Pilot Test

When evaluating final products, observations of performance are made and comments regarding tasks are recorded (Dumas, 1999). Before conducting our assessment on study participants, a walk-through of our usability test was completed by two older women. No changes were made to the script following the walk-through.

2.2 Focus Group Population and Procedure

Four focus groups were conducted to understand if the Toolkit is satisfying to users, easy to use, and if older adults would actually use it. Focus groups are semi-structured group interviews, guided by a trained facilitator to address a topic of interest. Each member of the research team (the moderator and primary investigator) conducted a thematic analysis to construct individual findings. The objective was to clearly understand the perspective of those interviewed and to identify commonalities and differences in their view points. Each member of the research team reviewed the others' records and reconciled discrepancies. Following independent analysis, the research team then compared and contrasted their perceptions and worked collaboratively to integrate individual findings into a consensus summary report that served as a finalized data file.

Participants were recruited from a population of adult's age 65 years and older and were drawn from four locations: an urban senior center fitness class, an urban fitness center fall prevention class, and two separate rural health clinics. Participants were recruited by employees of each location. The study purpose was explained and an invitation to participate was offered. Eight to fifteen volunteers were scheduled per focus group. Informed consent was obtained prior to the start of the study.

Approximately two weeks prior to the focus group session, participants were provided the *Falling Less in Kansas* toolkit and a pre-session survey (see Appendix 1). The survey questions included demographics (age,

education level, and sex), self-reported prior falls, and current fall prevention habits. Self-reported health habits were obtained to identify which of the fall prevention strategies participants previously completed. Prior action in fall prevention strategies may indicate their prior perception on the importance of fall prevention. The survey also included questions on the attractiveness, ease of use, desire to use, and overall impression of the toolkit. Results of the focus group sessions can then be interpreted with respect to their self-reported health habits. Participants were asked to read the toolkit and complete a pre-focus group survey. Focus group sessions lasted approximately 60 minutes and were conducted by an experienced facilitator. The facilitator was academically trained in focus group facilitation using the Dumas (1999) method, has conducted focus groups for public health interests across the state of Kansas, and is considered qualified to lead these sessions. The moderator worked with the research team to develop focus group questions. The primary purpose of this process was to probe users' attitudes towards fall prevention and the *Falling Less in KS* toolkit and the desires to utilize the toolkit. Therefore, questions revolved around the importance of fall prevention and the appearance and ease of use of the toolkit. Following Dumas' concepts on testing usability (Dumas, 1999), the moderator was responsible for reading the questions and noting key concepts during the discussion. A second researcher observed the facilitation of discussion. Focus group discussion consisted of a pre-specified series of open ended questions (see Appendix 2). All sessions were audio taped and transcribed verbatim, with names of participants removed.

2.3 Usability Study Population and Procedure

Volunteers for the usability test were recruited by staff from the two rural health clinics. Participant enrollment was blocked in order to get two males and two females aged 65-79 years and two males and two females aged 80 years or older.

The goal of this usability test was to determine the usefulness, effectiveness, learnability, and attitude (likability) of the Falling LinKS Toolkit. The usability tests occurred in a room in a community building and a conference room of a hospital. After informed consent was obtained, but prior to participating in the usability test tasks, the participants were given the *Falling Less in Kansas* toolkit and 20-30 minutes to review. After their review, they were asked to read tasks (Appendix 3) from preprinted cards and then perform the tasks. Tasks were representative of Toolkit tasks and consisted of one task per Toolkit module. The participants were first asked to look at the cover of the toolkit and report what they thought of the general appearance. They were then asked to find the medication sheet in the toolkit and fill it in using their own medication bottles. After completing this list, they

were asked to find the vision section of the toolkit and complete the instructions on the page of the Amsler grid. The next task was to find the home safety section, read it and complete a home safety plan. They were then asked to pick out three exercises in the difficulty level of choice and perform the exercises. Finally, they were asked to report their overall reaction to the toolkit and the tasks they were asked to complete. In this process, the participants began seated in a chair at a table across from two researchers. A video camera was placed to the side of the participant. Instructions were given to the participants. They were advised to turn over cards with tasks printed on them, to read the task, find the appropriate task in the toolkit, and then perform the task. The researchers tracked the time it took to read the task card, find the specified section in the toolkit and perform the task. When the task was completed, time was stopped and the participant reported their reaction to the task. The participant then proceeded with the next task card, and continued this process until all the tasks were completed. Following the completion of all of the tasks, the overall reaction to the toolkit was obtained. They were thanked for their participation and allowed to keep the toolkit for their reference. Data collected included: success/failure of each task, time to find the specified section of the toolkit and to task completion, and participant reactions to each task. Each participant was independently observed by two researchers and video recorded. Following completion of the tasks, the participants completed a posttest questionnaire (see Appendix 1) regarding their prior fall prevention habits and perceptions of the toolkit; including strengths, weaknesses, and ease of use.

2.4 Data Analysis and Interpretation

Quantitative data regarding participant characteristics, pre and post survey data and portions of the usability data are presented as means or percentages as appropriate. Participants with residence in an urban community were compared with those residing in a rural community with respect to demographic and outcome data. Descriptive statistics were used to analyze survey results. Categorical variables were compared by the chi-square or Fisher's exact test. Focus group data was transcribed and reviewed for discrepancies by a second research team member. Unidentified quotes were used to illustrate key themes along with a data driven inductive analysis. Data was analyzed using SPSS for Windows; Version 20.0 All statistical analyses were performed using SPSS for Windows, Version 20.0 (SPSS, Chicago, IL).

CHAPTER 3

RESULTS

The following information on participant characteristics, self-reported health habits, and participant use of toolkit reflects participants from both the focus and usability groups. This information is reported to provide a general description of study participants.

3.1 Participant Characteristics (Survey)

The average age of all participants who completed a survey (both focus group and usability participants) was 74.8 years, with the average rural participants 5 years older than urban participants, see Table 1.

Table 1. Participant Characteristics (n=32)

	Total (n=32)	Urban n=14 (43.8)	Rural n=18 (56.3)	<i>p</i>
Age (mean, SD)	74.79 (9.03)	72.00 (10.30)	77.40 (7.03)	0.162
Age (<i>f</i> , %)				0.164
55-64	3 (9.4)	3 (21.4)	0 (0.0)	
65-79	16 (50.0)	7 (50.0)	9 (60.0)	
80+	10 (31.3)	4 (28.6)	6 (40.0)	
Gender (<i>f</i> , %)				0.077
Male	3 (9.4)	0 (0.0)	3 (20.0)	
Female	26 (81.3)	14 (48.3)	12 (80.0)	
Education Level (<i>f</i> , %)				0.001
High School or Less	12 (37.5)	1 (9.1)	11 (73.3)	
Some College	8 (25.0)	4 (36.4)	4 (26.7)	
College Degree	6 (18.8)	6 (54.5)	0 (0.0)	
Falls in Past Year (<i>f</i> , %)				0.287
0	10 (31.3)	6 (42.9)	4 (25.0)	
1-4	18 (56.3)	8 (57.1)	10 (62.5)	
>5	2 (6.3)	0 (0.0)	2 (12.5)	
Live With (<i>f</i> , %)				0.156
Alone	11 (34.4)	7 (50.0)	4 (25.0)	
Spouse or Other	19 (59.4)	7 (50.0)	12 (75.0)	
Live In (<i>f</i> , %)				0.341
House or Apartment	29 (90.6)	14 (100.0)	15 (93.8)	
Other	1 (3.1)	0 (0.0)	1 (6.2)	

Information regarding current “toolkit practices” (behaviors identified by the Toolkit as important for fall prevention) are as follows, Seventy-two percent of participants reported they exercise regularly, with many (43.8%) exercising at least five days per week. Most of the rural participants (61.3%) exercise at home. Almost all (93.8%) reported having discussed their medications with their primary care provider in the past year, but only one said changes had been made after a fall. Most adults (75%) had an eye exam in the past year, or have one scheduled (18.8%). Two participants have had a structured home safety evaluation and two additional participants have plans to have one completed (Table 2).

Table 2. Self-Reported Health Habits (n=32)

	Total (n=32)	Urban 14 (43.8)	Rural 18 (56.3)	<i>P</i>
Exercise Habits				0.031
Routinely Exercise	23 (71.9)	14 (100.0)	9 (52.9)	
Plan to start an exercise program, not yet started	2 (6.3)	0 (0.0)	2 (11.8)	
Have no plans to exercise	4 (12.5)	0 (0.0)	4 (23.5)	
Do not know how to start an exercise program	2 (6.3)	0 (0.0)	2 (11.8)	
Exercise Location (<i>check all that apply</i>)				
Home	19 (59.4)	8 (57.1)	11 (61.1)	0.821
Senior Center	6 (18.8)	6 (42.9)	0 (0.0)	0.002
Community Fitness Center (non senior center)	8 (25.0)	8 (57.1)	0 (0.0)	0.000
Other	7 (21.9)	4 (28.6)	3 (16.7)	0.419
Exercise (days per week)				0.177
0	3 (9.4)	0 (0.0)	3 (20.0)	
1-2	3 (9.4)	1 (7.1)	2 (13.3)	
3-4	8 (25.0)	6 (42.9)	2 (13.3)	
5-7	14 (43.8)	7 (50.0)	7 (46.7)	
Other	1 (3.1)	0 (0.0)	1 (6.7)	
Discussion Regarding Medications with PCP				0.388
Discussed medications with PCP, past year	30 (93.8)	13 (100.0)	17 (94.4)	
Plans to discuss medications with PCP	0	0 (0.0)	0 (0.0)	
No plans to discuss medications with PCP	1 (3.1)	0 (0.0)	1 (5.6)	
Do not have a PCP	0	0 (0.0)	0 (0.0)	
PCP Made Changes to Medications After Fall				0.091
Yes	1 (3.1)	1 (7.7)	0 (0.0)	
No	22 (68.8)	7 (53.8)	15 (93.8)	
Unsure	1 (3.1)	1 (7.7)	0 (0.0)	
Not Applicable	5 (15.6)	4 (30.8)	1 (6.2)	
Describes Vision Care				0.237
Had vision exam within past year	24 (75.0)	12 (85.7)	12 (66.7)	
Have plans to have a vision exam	6 (18.8)	1 (7.1)	5 (27.8)	
Have no plans to have a vision exam	1 (3.1)	1 (7.1)	0 (0.0)	
Do not know how to schedule a vision exam	0	0 (0.0)	0 (0.0)	
Do not have a vision doctor	1 (3.1)	0 (0.0)	1 (5.6)	
Describes Home Safety Plans				0.18
Had home safety evaluation within past year	2 (6.3)	1 (7.7)	1 (7.7)	
Plan to have a home safety evaluation	2 (6.3)	1 (7.7)	1 (7.7)	
No plans to have a home safety evaluation	18 (56.3)	11 (84.6)	7 (53.8)	
Do not know how to get home safety evaluation	4 (12.5)	0 (0.0)	4 (30.8)	

Although we asked the participants to review the toolkit and did not specifically ask them to utilize the toolkit, we did inquire in the survey if they performed any of the activities. With respect to participant use of the Toolkit, most focus group participants (84%) read the toolkit prior to the session, but only four participants had written a fall prevention plan. Over half (59.4%) of the adults attempted the exercises in the toolkit, 21.9% scheduled an appointment with their PCP (but not necessarily to review medications), six people scheduled a vision exam, and one person scheduled a home safety evaluation. Many of the adults (68.8%) would recommend the toolkit to a friend (Table 3).

Table 3. Participant Use of Toolkit (n=32)

	Total (n=32)	Urban 14 (43.8)	Rural 18 (56.3)	<i>p</i>
Read Toolkit				0.136
Yes	27(84.40)	12 (100.0)	15 (83.3)	
No	3 (9.4)	0 (0.0)	3 (16.7)	
Write Fall Prevention Plan				0.183
Yes	4 (12.5)	3 (25.0)	1 (6.7)	
No	23 (71.9)	9 (75.0)	14 (93.3)	
Try to Perform Exercises				0.637
Yes	19 (59.4)	9 (75.0)	10 (66.7)	
No	8 (25.00)	3 (25.0)	5 (33.3)	
Schedule Appointment PCP				0.079
Yes	7 (21.9)	1 (9.1)	6 (40.0)	
No	19 (59.4)	10 (90.3)	9 (60.0)	
Schedule Vision Exam				0.144
Yes	6 (18.8)	1 (8.3)	5 (31.2)	
No	22 (68.8)	11 (91.7)	11 (68.8)	
Schedule Home Safety Evaluation				0.359
Yes	1 (3.1)	0 (0.0)	1 (6.2)	
No	28 (87.5)	13 (100.0)	15 (93.8)	
Recommend to a Friend				0.244
Yes	22 (68.8)	9 (90.0)	13 (100.0)	
No	1 (4.3)	1 (10.0)	0 (0.0)	

The following information reflects participant’s general reaction to the Toolkit. The surveys revealed overall satisfaction with the toolkit (65.7%). The participants felt the toolkit was easy to use (68.8%) and easy to understand (75%). They also felt the information was interesting (65.6%) and slightly over half (59.4%) thought they would use the toolkit in the future (Table 4).

Table 4. Survey Respondent Reaction to Toolkit

Toolkit	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Nice General Appearance	9 (28.1)	14 (43.8)	2 (6.3)	0	0
Easy to Use	8 (25.0)	14 (43.8)	2 (6.3)	0	1 (3.1)
Instructions Easy to Understand	8 (25.0)	16 (50.0)	2 (6.3)	0	0
Interesting	5 (15.6)	16 (50.0)	3 (9.4)	0	1 (3.1)
Size of Wording Made it Easy to Read	13 (40.6)	12 (37.5)	1 (3.1)	0	0
Information was Helpful	5 (15.6)	13 (40.6)	6 (18.8)	2 (6.3)	0
Information was Easy to Find	4 (12.5)	12 (37.5)	9 (28.1)	1 (3.1)	0
Will Use in Future	7 (21.9)	12 (37.5)	4 (12.5)	1 (3.1)	2 (6.3)
Overall, was Very Satisfied	6 (18.8)	15 (46.9)	4 (12.5)	0	1 (3.1)

3.2 Focus Group Participants

Thirty volunteers participated in four focus groups and twenty-eight completed the post session survey. The average age of the participants was 74 years (range 55-85 yrs), with gender being predominantly female (82%). While the researchers requested participants be 65 years or older, three participants recruited by staff at an urban fall avoidance class were under age 65 years. The ages were not known until after the focus group session was completed. There was equal distribution between rural and urban residents with the majority living with a spouse or another person (60.7%). Over half (62.6%) of participants had fallen at least once in the past year.

3.3 Focus Group Response to Toolkit

Older adults in the focus groups agreed that education on fall prevention is important for their age group, *“very important, but age 65 is not early enough to start.”* Although many of the participants (62.6%) had fallen in the last year, they admitted they did not think they needed information regarding fall prevention until they suffered an injury from a fall, or did not need the information at all. *“It’s for people who can’t do things.”* Participants suggested excuses for their own fall and did not think their fall was preventable. Participants, especially the rural

adults, feel although the medication section in the toolkit is good, it is not necessary because they trust their primary care provider and pharmacist to oversee their medications. *“My doctor and pharmacist keep very good track of all of my medications.”* There was minimal discussion regarding the vision section since most (75%) routinely have vision exams by an ophthalmologist. Although some of the home safety suggestions, such as eliminating throw rugs, were felt to be well known, participants reported they learned something new in this section and felt it to be informative. Participants discussed the importance of exercise for overall health. The urban participants were all involved in organized exercise classes but felt the toolkit was useful for older adults who could not travel to an organized class. The exercises *“help those in smaller towns that are unable to make it to classes.”* Rural participants felt working on the farm qualified as exercising.

Negative reactions to the toolkit include that it contains too much information and is overwhelming. *“Too much information to send home. Something down to 4 pages would be better.”* *“A lot of the information was repetitive.”* *“Doing the home things seemed daunting.”* *“Toolkit is a good option. Maybe need something else first.”* One participant commented on misspelled words in the toolkit.

Overall, the *“title draws you in”* and the font size is *“appropriate.”* Generally, the participants felt the information was interesting (85.7%) and many reported they would use the toolkit in the future (68.1%). Rural participants reported they would likely pick up the toolkit on their own since they had already fallen at least once, but preferred a discussion regarding fall prevention be initiated by their healthcare provider. Participants reported they would recommend this toolkit to others they felt needed it. *“I would like to get a copy for my sister.”* Overall comments were positive. *“I applaud whoever is trying. It is really needed, no matter the criticisms.”*

3.4 Usability Group Participants

Six volunteers participated in the usability portion of the study. Four of the participants completed the post session survey. One participant dropped out of the study midway through the task portion and another did not complete the survey. The average age of the participants was 76 years (range 71-85 yrs) with gender being equally distributed between males and females. Half of the participants live alone, and only one reported not falling at least once in the past year.

3.5 Usability Group Response to Toolkit and Ease of Use

Task 1: Reaction to Cover

The participants were initially asked to evaluate the cover of the toolkit and they provided generally positive comments. Comments included: the toolkit looked nice, had good color and got your attention. A couple negative comments were mentioned. Although the people on the cover looked like they were having fun, they looked too young to worry about falling. Additionally, one person was confused with the “blurry” background of the picture. They thought these were blurry words that they could not read.

Task 2: Medications

The participants were asked to open the book to the medication page and complete the medication list. It took them an average of 1 minute 14 seconds to find the page (range 18 seconds -2 min 39 seconds), with one person having a difficult time finding the medication list. Another person had a difficult time understanding the instructions, but when given additional instructions by the researcher, was successful in completing the task. None of the participants had difficulty writing the medication names, but there was variance in doses and frequency. Some participants wrote “2 at a time” or “one tab” instead of actual milligrams. Three of four of the participants thought it was a good idea to have their medications written down in this format.

Task 3: Vision

The vision task was a little more difficult to find and understand. It took participants an average of 1 minute 24 seconds (range 56 seconds to 1 minute 51 seconds) to find the Amsler grid, but all were able to complete it. One participant did not understand the purpose of the vision test.

Task 4: Home Safety

The participants had no difficulty completing part of the home safety plan. It took an average of 1 minute and 10 seconds (range 19 seconds – 3 minutes 5 seconds) to find the home safety section of the toolkit. They all had positive comments regarding the suggestions to make their home safer.

Task 5: Physical Activity

Finding the physical activity section was the final task and the participants had no difficulty finding this section (30 seconds), nor did they have any difficulty performing the exercises. Their overall reactions to the exercises were positive and they thought the instructions were easy to follow.

Task 6: Overall Response

All of the participants that completed the tasks had positive comments about the toolkit. They thought it was attractive, interesting, and easy to use. They reported that the use of this toolkit would help older adults avoid falls. They were very satisfied with the toolkit and would likely recommend it for use.

CHAPTER 4

DISCUSSION

The adults in our study were aware of the high incidence of falls and most were aware of several strategies that decrease fall risk, but were uncertain if many were modifiable. The severity of consequences that result from falls has led older adults to believe that fall prevention is very important.

4.1 Usability of the *Falling Less in Kansas* Toolkit

This study addressed the several goals recommended in assessing usability of a product: usefulness, effectiveness, learnability, and attitude (likability). All adults demonstrated their ability to use the toolkit successfully. After a brief time to peruse the toolkit, older adults were able to quickly locate specified sections of the toolkit without much difficulty. The ease of finding specific sections increased as more sections were evaluated. One participant was actually successful at finding the assigned sections by utilizing the color bars at the bottom of the page. The participants requested additional copies of the toolkit for distribution. They demonstrated learnability by correctly completing the tasks. Some adults had difficulty understanding the tasks requested by the researchers. Once the researcher further explained the instructions on the task card, the participant was able to perform the tasks with accuracy.

Medication Review and Modification

Ninety-three percent of participants report they regularly discuss their medications with their PCP. Identifying the medication list in the toolkit was not difficult. Although an area of inaccuracy was observed with transcribing the correct dosage on the medication list page, participants easily listed their medications. The medication list in the toolkit should be completed by the adult and brought to their PCP for thorough review and consideration of eliminating fall risk medications.

Vision

Only one participant reported not having a vision exam in past year or having one currently scheduled. No adults had difficulty following the instructions with the Amsler grid, but several reported a lack of understanding of what to do with the results. Many older adults reported having regular eye exams, and consequently, the adults that did not think the vision section was very beneficial.

Home Safety

One participant reported they would schedule a home safety evaluation after reviewing the toolkit. Most adults found new and good information in the home safety section, but would only choose to make a few of the recommended changes to their home. As demonstrated by Whitehead, most adults feel their home is already safe (Whitehead, 2006). One month follow-up after providing older fall patients with brochures on home safety recommendations did not show any changes made to the home compared to adults who did not receive the brochure (Gerson, 2004). Moreover, limited funds can minimize home revisions. If a home safety evaluation recommends hand rails in the bathtub, the financial barrier may overcome the benefit of the handrails. One must believe that the barrier is worth overcoming to change behavior (Kempton, 2000). Since a study in Australia found only 5 percent of approached persons agree to a home hazard assessment (Whitehead, 2006), any changes made to the home as suggested in the toolkit should be beneficial.

Exercise

Although participants feel the majority of older adults do not exercise, they believe exercise is important. Only three of the participants reported they do not ever exercise. Exercise keeps older adults active. The exercise section received very positive reviews and none of the participants had difficulty following the instructions for the exercises. In addition to being easy to perform, participants felt the exercises were advantageous for people who are unable to travel to organized exercise classes. Similar to previous studies, rural participants mentioned barriers to traveling to exercise classes, including: cost of transport, travel distance, parking, and seasonal restraints on driving (Hutton, 2009). Additional barriers include illness of a spouse and lack of family support (Hutton, 2009). The *Falling Less in Kansas* toolkit provides exercises that can be done at home. Home-based exercises are suitable for fall prevention and are well-utilized by the older population (Sjosten, 2007). Although the socialization during group exercise was considered a benefit, home exercises, as provided by this toolkit, allow for overcoming of previously identified barriers; pressure to keep up, different levels of fitness, and self-consciousness of exercising with gym equipment (Hutton, 2009) The clear explanations of the exercises in the toolkit addresses the excuse of lack of desire to exercise secondary to lack of self-efficacy (Hutton, 2009 & Whitehead, 2006).

Overall Reaction

Overall, the participants had positive reactions to the toolkit. They felt the toolkit was important, attractive, and easy to read with proper font size. Participants expressed the importance of utilizing fall prevention strategies, such as those demonstrated in the toolkit. Interestingly, as noted by the toolkit developers, (Radebaugh, 2011) the participants felt the toolkit was good for other older adults rather than themselves. Although most of our participants had fallen, they provided an excuse for their fall and did not think they needed intervention themselves. A low self-perceived risk of falling is a predictor of participating in interventions such as exercise (Sjosten, 2007). Whitehead and colleagues evaluated the likelihood of older adults, after suffering a fall, of participating in a fall prevention program. Although 68% of their participants stated they feared falling, only 52% considered fall prevention intervention after their fall. Many felt falls were nonpreventable. When asked specifically, 63% would consider exercising, 57% considered obtaining a home assessment, and 59% would stop taking implicated medications (Whitehead, 2005). Of our rural participants, 52% reported they already exercise and another 12 % would like to start. Only 6% of all participants considered having a home safety assessment. In accordance with the Health Belief Model, the participants perceived consequences of falls as serious, but lacked the feeling that they were susceptible to falling. The participants' lack of feeling the need for this toolkit for themselves may have contributed to them not completing a fall prevention plan.

4.2 Future Research/Study Participant's Suggestions

Completion of a well-designed product does not ensure its use. Understanding human behavior and factors that influence change will assist in predicting whether the product will actually be utilized. Subject compliance is the most commonly reported barrier to successful fall prevention intervention (Fortinsky, 2004). Even though the toolkit was attractive and easy to use, the majority of participants did not develop a fall prevention plan and did not think they would ever use the toolkit. Focus group participants reported they would be more likely to use the toolkit if it was introduced to them by either their primary healthcare provider (PCP) or social media. There are barriers to having a PCP introduce the toolkit, including lack of appropriate fall prevention training, competing risks, and lack of time (Chou, 2006). The American Geriatrics Society (AGS, 2001) recommends all adults 65 years or older be assessed annually for falls (AGS, 2001). Despite this recommendation, only 37% of older adults are asked by their PCP if they have fallen (Wenger, 2003).

Older adults gain knowledge of fall prevention programs from a variety of resources, including: general practitioners (32%), family members (23%), community health nurses and other health workers (20%) (Kempton, 2000). In addition to discussion with primary care providers, our participants encouraged dissemination of fall prevention strategies through social media and community organizations. Future research could evaluate if distribution of educational materials by these avenues has a higher utilization rate than when introduced by other means. Compliance with fall prevention programs determines its success.

4.3 Study Limitations

The results of our survey are limited by a small sample size. Therefore, they may not be a true representation of the general population, making it difficult to generalize the findings. Also, the survey was a self-report, thus may incorporate recall bias. Self selection of participants in our focus groups and usability study population may also bias our results. The urban focus groups were all enrolled in exercise classes, so probably have strong positive attitudes towards exercise. These exercisers may be more motivated to learn fall prevention strategies and may be more apt to change behavior. Conversely, they may feel that exercising is enough to reduce their fall risk and consequently may not move forward with any additional Toolkit sections. Testing was done in an artificial situation on generally healthy individuals and may be more willing to participate. The act of conducting a study can lead to socially desirable results. Participants may try harder to accurately perform the tasks since someone is in the room monitoring them. The participants also may not feel comfortable expressing negative feelings towards the toolkit since this is an open discussion with the facilitator and other participants.

CHAPTER 5

CONCLUSIONS

Falls are prevalent in older, independent living adults. Participants in this study believe fall prevention education is important, but are hesitant to make significant changes in their behavior to reduce falls. Although older adults are generally unaware of specific ways to prevent falls, our study participants unknowingly follow prevention guidelines. Study participants exercised and underwent annual vision exams. They discussed their medications with their primary care provider but did not report specifically asking about medications that increase fall risk. Our participants were aware of a few home safety tips to reduce falls, but preferred not to make too much change. Participants reported they would recommend the well-designed toolkit, *Falling Less in Kansas*, to friends but identified the challenge in getting older adults to actually use it. They reported the toolkit would be most utilized if it was introduced to them by a healthcare provider (doctor or pharmacist) or in a social setting (senior center or church). Despite the *Falling Less in Kansas* toolkit being well designed, attractive and easy to use, older adult participants reported they would not utilize it independent of further fall prevention discussion by healthcare providers. Without personal intent, even fall risk reduction plans that are well designed lack insurance of use.

REFERENCES

REFERENCES

- American Geriatrics Society British Geriatrics Society and American Academy of Orthopedic Surgeons Panel on Falls Prevention. (2001). Guideline for the prevention of falls in older persons. *Journal of the American Geriatrics Society*, 49, 667-72.
- American Trauma Society. (n.d.). *Injury Awareness: Trauma Awareness Month*. Retrieved February, 2012 from <http://www.amtrauma.org/injury-prevention-programs/trauma-awareness-month/index.aspx>.
- Beer, C. (2006). Attitudes of GPs to medical management in a falls clinic service. *Australian Family Physician*, 35, 1008-10.
- Buatois, S., Perret-Guillaume, C., Gueguen, R., Miget, P., Vancon, G., Perrin, P., et al. (2010). A simple clinical scale to stratify risk of recurrent falls in community-dwelling adults aged 65 years and older. *Physical Therapy*, 90, 550-560.
- Carrol, N. V., Slattum, P. W., & Cox, F. M. (2005). The cost of falls among the community-dwelling elderly. *Journal of Managed Care Pharmacy*, 11, 307-16.
- Carter, N. D., Kannus, P., & Khan, K. M. (2001). Exercise in the prevention of falls in older people: a systematic literature review examining the rationale and the evidence. *Sports Medicine*, 31, 427-438.
- Centers for Disease Control and Prevention. (2003). Public health and aging: nonfatal injuries among older adults treated in hospital emergency departments –United States 2001. *Morbidity and Mortality Weekly Report*, 52, 1019-22.
- Centers for Disease Control and Prevention. (2011, September 16). *Home and Recreational Safety: Falls Among Older Adults*. Retrieved March, 2012 from www.cdc.gov/homeandrecreational/safety/falls/adultsfalls.html.
- Chang, J. T., Morton, S. C., Rubenstein, L. Z., Mojica, W. A., Maglione, M., Suttorp, M. J., et al. (2004). Interventions for the prevention of falls in older adults: systematic review and meta-analysis of randomized clinical trials. *British Medical Journal*, 328, 680.
- Chou, W. C., Tinetti, M. E., King, M. B., Irwin, K., & Fortinsky, R. (2006). Perceptions of Physicians on the barriers and facilitators to integrating fall risk evaluation and management into practice. *Journal of General Internal Medicine*, 21, 117-122.
- Clemons, T.E., Chew, E.Y., Bressler, S.B., McBee, W. (2003). "National Eye Institute visual function questionnaire in the age-related eye disease study (AREDS): AREDS report no. 10" *Archives of Ophthalmology*, 121, 211-217.
- Coleman, A. L., Cummings, S. R., Ensrud, K. E., Yu, F., Gutierrez, P., Stone, K. L., et al. (2009). Visual field loss and risk of fractures in older women. *Journal of the American Geriatrics Society*, 57, 1825-1832.
- Costello, E., & Edelstein, J. E. (2008). Update on falls prevention for community-dwelling older adults: review of single and multifactorial intervention programs. *Journal of Rehabilitation Research and Development*, 45, 1135-1152.
- Diener, D. D., & Mitchell, J. M. (2005). Impact of a multifactorial fall prevention program upon falls of older frail adults attending an adult health day care center. *Topics in Geriatric Rehabilitation*, 21, 247-257.
- Dumas, J. S., & Redish, J. C. (1999). *A Practical Guide to Usability Testing Revised*. Portland, OR: Intellect Books.
- Evron, L., Schultz-Larsen, K., & Fristrup, T. (2009). Barriers to participation in a hospital-based falls assessment clinic programme: an interview study with older people. *Scandinavian Journal of Public Health*, 37, 728-735.

- Fortinsky, R. H., Iannuzzi-Sucich, M., Baker, D. I., Gottschalk, M., King, M. B., Brown, C. J., et al. (2004). Fall-risk assessment and management in clinical practice: views from healthcare providers. *Journal of the American Geriatrics Society*, 52, 1522-6.
- Gangavati, A. S., Kiely, D. K., Kulchyyki, L. K., Wolfe, R. E., Mottley, J. L., Kelly, S. P., et al. (2009). Prevalence and characteristics of traumatic intracranial hemorrhage in elderly fallers presenting to the emergency department without focal findings. *Journal of American Geriatrics Society*, 57, 1470-1474.
- Geilen, A. C., & Sleet, D. (2003). Application of behavior-change theories and methods to injury prevention. *Epidemiologic Reviews*, 25, 65-76.
- Gerson, L. W., Camargo, C. A., & Wilber, S. T. (2005) Home modification to prevent falls by older ED patients. *American Journal of Emergency Medicine*, 23, 295-298.
- Gill, T.M., Robison, J. T., Williams, C. S., Tinetti, M. E. (1999) Mismatches between the home environment and physical capabilities among community-living older persons. *Journal of the American Geriatrics Society*, 47, 88-92.
- Gillespie, L. D., Gillespie, W. J., Robertson, M. C., Lamb, S. E., Cumming, R. G., & Rowe, B. H. (2003). Interventions for preventing falls in elderly people. *Cochrane Database of Systematic Reviews*, 4, CD000340.
- Haque, R. (2009) ARMOR: A tool to evaluate polypharmacy in elderly persons. *The Annals of Long-Term Care*, 17, 26-30.
- Harling, A., & Simpson, J. P. (2008). A systematic review to determine the effectiveness of Tai Chi in reducing falls and fear of falling in older adults. *Physical Therapy Reviews*, 13, 237-248.
- Hayden, J. A. (2009). *Introduction to health behavioral therapy*. Mississauga, Ontario: Jones & Bartlett Publishers.
- Hill, A. M., McPhail, S. M., Hoffmann, T., Hill, K., Oliver, D., Beer, C., et al. (2009). A randomized trial comparing digital video disc with written delivery of falls prevention education for older patients in hospital. *Journal of the American Geriatrics Society*, 57, 1458-1463.
- Hutton, L., Frame, R., Maggo, H., Shirakawa, H., Mulligan, H., Waters, D., et al. (2009). The perceptions of physical activity in an elderly population at risk of falling: a focus group study. *Journal of Physiotherapy*, 37, 85-92.
- Kelly, K. D., Pickett, W., Yiannakoulis, N., Rowe, B. H., Schopfloch, D. P., Svenson, L., et al. (2003). Medication use and falls in community-dwelling older persons. *Age and Aging*, 32, 503-509.
- Kempton, A., Van Beurden, E., Sladden, T., Garner, E., & Beard, J. (2000). Older people can stay on their feet: final results of a community-based falls prevention programme. *Health Promotional International*, 15, 27-33.
- Koestner, A., Walters, M. R., Mattice, C., Manion, P., & Seguin, C. (2009). Senior lifestyles and injury prevention: evaluating the effectiveness of an injury prevention program for older adults. *Journal of Trauma Nursing*, 16, 87-92.
- Kragh, A., Elmstahl, S., & Atroshi, I. (2011). Older adults' medication use 6 months before and after hip fracture: a population-based cohort study. *Journal of the American Geriatrics Society*, 59, 863-868.
- Kwan, M. M., Close, J. C. T., Wong, A. K. W., & Lord, S. R. (2011). Falls incidence, risk factors, and consequences in Chinese older people: a systematic review. *Journal of the American Geriatrics Society*, 59, 536-543.
- Lord, S.R., Menz, H.B., Sherrington C. (2006). Home environment risk factors for falls in older people and the efficacy of home modifications. *Age and Ageing*, 35-S2: ii55-ii59.

- McGinnis, J. M., Williams-Russo, P., & Knickman, J. R. (2002). The case for more active policy attention to health promotion. *Health Affairs, 21*, 78-93.
- Means, K. M., O'Sullivan, P. S., & Rodell, D. E. (2003). Psychosocial effects of an exercise program in older persons who fall. *Journal of Rehabilitation Research and Development, 40*, 49-58.
- Melzer, I., Kurz, I., Shahar, D., & Oddsson, L. I. E. (2009). Predicting injury from falls in older adults: comparison of voluntary step reaction times in injured and noninjured fallers – a prospective study. *Journal of American Geriatrics Society, 57*, 743-744.
- Page, P., Rogers, M. E., Topp, R., Rimmer, J., Chodzko-Zajko, W., Himes, C., et al. (2004). The active aging toolkit: promoting physical activity in older adults for healthcare providers. Retrieved from The Hygenic Corporation website: <http://www.firststeptoactivehealth.com>.
- Radebaugh, T. S., Bahner, C. A., Ballard-Reisch, D., Epp, M., Hale, L. S., Hanley, R., et al. (2011). Falling Less in Kansas: Development of a fall risk reduction toolkit. *Journal of Aging Research, 2011*, 1-7.
- Rose, D. J. (2008). Preventing falls among older adults: No “one size suits all” intervention strategy. *Journal of Rehabilitation Research and Development, 45*, 1153-1166.
- Rubin, J. (1994). *Handbook of Usability Testing*. New York, NY: John Wiley & Sons, INC.
- Ruddock, B. (2004). Medications and falls in the elderly. *Canadian Pharmaceutical Journal/La Revue Pharmaceutique Canadienne, 137*, 17-18.
- Salminen, M. J., Vahlberg, T. J., Salonoja, M. T., Aarnio, P. T., & Kivela, S. L. (2009). Effect of a risk-based multifactorial fall prevention program on the incidence of falls. *Journal of the American Geriatrics Society, 57*, 612-619.
- Sjoston, N. M., Salonoja, M., Piirtola, M., Vahlberg, T. J., Isoaho, R., Hyttinen, H. K., et al. (2007). A multifactorial fall prevention programme in the community-dwelling aged: predictors of adherence. *European Journal of Public Health, 17*, 464-470.
- Tinetti, M. E., Baker, D. I., King, M., Gottschalk, M., Murphy, T. E., Acampora, D., et al. (2008) *The New England Journal of Medicine, 8*, 305-310.
- Wenger, N. S., Solomon, D. H., Roth, C. O., MacLean, C. H., Saliba, D., Kamberg, C. J., et al. (2003). The quality of medical care provided to vulnerable community-living older patients. *Annals of Internal Medicine, 139*, 740-7.
- Wichita State University Regional Institute on Aging Falling LinKS Research Team. (2010) *The Falling LinKS Toolkit*. Available at <http://www.wichita.edu/aging>. (Retrieved Jan, 2012)
- Wichita State University Regional Institute on Aging, (2011). Available at <http://webs.wichita.edu/?u=AGING&p=/FallingLinKS>
- Whitehead, C. H., Wundke, R., & Crotty, M. (2006). Attitudes to falls and injury prevention: what are the barriers to implementing falls prevention strategies? *Clinical Rehabilitation, 20*, 536-542.
- Yardley, L., Donovan-Hall, M., Francis, K., & Todd, C. (2006). Older people's views of advice about falls prevention: a qualitative study. *Health Education Research, 21*, 508-517.
- Zahn, C., & Bierman, S. (2001). Potentially inappropriate medication use in the community-dwelling elderly: findings from the 1996 Medical Expenditure Panel Survey. *Journal of the American Medical Association, 286*, 2823-29.

APPENDICES

Appendix 1

**Assessment of Community Fall Prevention Toolkit
Demographic Survey: Focus Group**

Thank you for participating in this survey. All information you provide will be kept confidential and will help investigators understand the use of fall prevention guidelines by older people.

1. How many falls have you had in the past year? _____

2. Please check the box that describes your exercise habits:

(check one box only)

- I routinely exercise
- I have plans to start an exercise program, but have not yet started.
- I have no plans to exercise.
- I do not know how to start an exercise program.

3. If you exercise, where do you exercise? **(check all that apply)**

- home
- senior center
- community fitness center (other than senior center)
- other, please specify _____

4. About how many days each week do you exercise? _____

5. If you have not yet started exercising, please explain why:

Please check the box that best describes your discussions regarding medications with your primary care provider (PCP):

6. I have: **(check one box only)**

- discussed my medications with my PCP in the past year.
- a desire to discuss my medications with my PCP.
- no plans to discuss my medications with my PCP.
- I do not have a primary care provider.

7. If you have not reviewed your medications with your primary care provider, please explain:

8. If you have ever fallen, has your primary care provider made any changes to your medications after your fall?

- Yes
- No
- I am unsure
- Not applicable

9. Please check the box that best describes your vision care:

(check one box only)

- I have had a vision exam within the past year.
- I have plans to have a vision exam soon.
- I have no plans to have a vision exam.
- I do not know how to schedule a vision exam.
- I do not have an eye doctor.

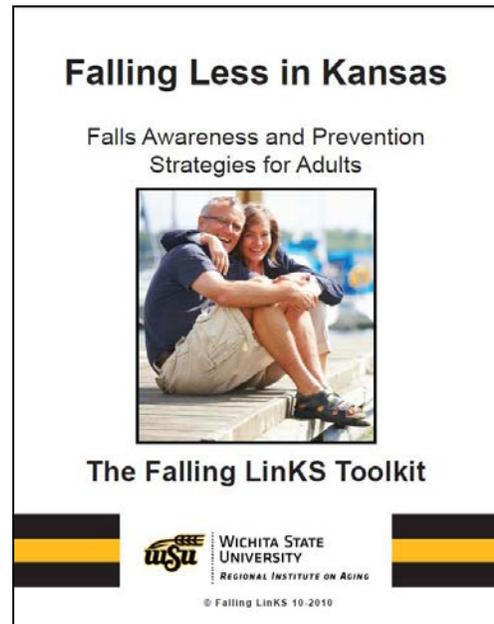
10. If you have not had a vision exam in past year and have not scheduled an exam, please explain:

11. Please check the box that best describes your home safety plans:
(check one box only)
- I have had a home safety evaluation completed by a medical professional in the past year.
 - I have plans to have a home safety evaluation soon.
 - I do not have plans to have a home safety evaluation completed.
 - I do not know how to schedule a home safety evaluation.

12. If you have not had a home safety evaluation, or scheduled one to be done, please explain:

Prior to this meeting, you have received the Falling Less in Kansas toolkit as pictured here. Please describe your use of the toolkit.

13. Did you read the toolkit?
 Yes No
14. Did you write a fall prevention plan?
 Yes No
15. Did you try to perform the pictured exercises?
 Yes No
16. Did you schedule an appointment with your primary care practitioner to review your medications?
 Yes No
17. Did you schedule a vision exam?
 Yes No
18. Did you schedule a home safety evaluation?
 Yes No



Please check the box that best describes your agreement or disagreement with the statement provided.		Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
19.	It had a nice general appearance.					
20.	It was easy to use.					
21.	The instructions were easy to understand.					
22.	It was interesting					
23.	The size of the wording made it easy to read.					
24.	The information was helpful to me.					
25.	Information I was looking for was easy to find.					
26.	I will use it in the future.	30				
27.	Overall, I was very satisfied with it.					

28. What did you like MOST about the toolkit?

29. What did you like LEAST about the toolkit?

30. What should be changed about the toolkit to make it better?

31. Would you recommend the toolkit to a friend?

- Yes No

32. What is your gender?

- Male Female

33. What is your age? _____

34. What is the highest education level you have completed?

- High school or less Some college College degree

35. I live:

- alone with spouse or other

36. I live in:

- a house or apartment
 assisted living complex
 other, please specify _____

37. How many prescription medications do you take at home? _____

38. Have you ever been diagnosed with any of the following medical conditions? (*check all that apply*)

- | | | |
|--|--|--|
| <input type="checkbox"/> Diabetes | <input type="checkbox"/> Osteoporosis | <input type="checkbox"/> Urinary problems |
| <input type="checkbox"/> Heart Disease | <input type="checkbox"/> Vision problems | <input type="checkbox"/> Memory problems |
| <input type="checkbox"/> Depression | <input type="checkbox"/> Cancer | <input type="checkbox"/> Hypo/hyperthyroid |
| <input type="checkbox"/> Arthritis | <input type="checkbox"/> Stroke | <input type="checkbox"/> Other _____ |

Appendix 2

I. Questions about Your Beliefs about Fall Prevention

The number of years that people live is increasing. As people age, they are at increased risk of falling. Fall prevention interventions may decrease the risk of falling in older adults. I would like to start by asking some questions about how you feel about fall prevention in general.

- How important do you feel fall prevention is in your age group?
 - If important, why?
 - If not important, why not?
- Do you feel you can do things to help prevent falls?

II. Questions about Perceptions of Toolkit

Now specifically I want to ask you about your thoughts about the fall prevention toolkit that you were asked to review and use in the past two weeks.

- Do you think the toolkit had a nice general appearance?
 - Why or why not?
- Do you think the toolkit was interesting?
- What did you like about the Toolkit?
- What parts of the toolkit were easy to use?
 - Why?
 - Was the size of the wording easy to read?
- Did you think the instructions in the Toolkit were easy to follow?
 - If not, why not?
- Was the information in the toolkit helpful to you?

- What did you dislike about the Toolkit?
- What parts of the toolkit were difficult to use?
 - Why?
- What would you like to see changed in the Toolkit to make it better?

- Would you likely use this Toolkit to prevent falling?
 - If not, why not?
- Would you recommend this Toolkit to your friends?
 - Why or why not?

- What do you think is the best way to communicate fall prevention information to older adults such as yourselves?
 - Print material
 - Healthcare providers
 - Media
- How can we encourage older adults to be more proactive in reducing their risk of falling?

Appendix 3

<i>Falling Less in Kansas</i> Measurement and Tasks	
MEASUREMENT	TASK
<ul style="list-style-type: none"> • Participant reaction to cover 	<p>TASK 1: General Appearance</p> <p>Look at the cover of the toolkit and tell me what you think about the appearance.</p>
<ul style="list-style-type: none"> • Time to find the Medication Safety section • Accuracy of completing the medication list • Participant reaction to the medication list 	<p>TASK 2: Medication Safety</p> <p>One of the CDC guidelines for fall prevention is to have your primary care provider conduct a medication review using the information you, as the patient, provides. Please complete the medication list with information from these medication containers.</p> <ul style="list-style-type: none"> A. Find the medication sheet. B. Using the labeled medication containers provided, please complete the medication list. C. When you have completed this task, please close the book. D. Tell the researcher what you thought about the Medication Safety section of the toolkit.
<ul style="list-style-type: none"> • Time to find the Vision Screen • Ability to complete vision screen • Participant reaction to the vision screen 	<p>TASK 3: Vision</p> <p>One of the CDC guidelines for fall prevention is a vision screen. The toolkit has a vision screen provided.</p> <ul style="list-style-type: none"> A. Please open the book and find the vision screen (Amsler Grid). B. Please complete the vision screen by following the directions provided. C. When you have completed this task, please close the book. D. Tell the researcher what you thought about the Vision Screen section of the toolkit.
<ul style="list-style-type: none"> • Time to find the Home Safety section • Accuracy in completing home safety plan • Participant reaction to home safety plan 	<p>TASK 4: Home Safety Evaluation</p> <p>Another CDC guideline for fall prevention is a home assessment for fall risks. The toolkit has recommendations for reducing fall risks in homes.</p> <ul style="list-style-type: none"> A. Please find the home safety information in the toolkit. B. Read the home safety information on fall risks in the home. C. Please complete a home safety plan utilizing the information you gained

	<p>from the home safety section of the toolkit.</p> <p>D. When you have completed this task, please close the book.</p> <p>E. Tell the researcher what you thought about the Home Safety section of the toolkit.</p>
<ul style="list-style-type: none"> • Time to find the Physical Activity section • Ability to complete (3) physical exercises • Participant reaction to the physical activity instructions 	<p>TASK 5: Physical Activity</p> <p>The fourth CDC recommended guideline for fall prevention is increase physical activity. The toolkit has several descriptions of some exercises that will help increase balance to reduce fall risk.</p> <p>A. Please find the physical activity section of the toolkit.</p> <p>B. Please choose the level of exercise that you feel most comfortable practicing.</p> <p>C. Please choose 3 exercises and demonstrate your ability to follow what the toolkit is teaching.</p> <p>D. When you have completed this task, please close the book.</p> <p>E. Tell the researcher what you thought about the Increasing Physical Activity section of the toolkit.</p>
<ul style="list-style-type: none"> • Participant reaction to toolkit in general • Participant ideas for personal fall prevention plan 	<p>TASK 6: Overall Reaction</p> <p>The Falling Less in Kansas toolkit was designed specifically for older adults to work towards self-directed fall prevention.</p> <p>A. Please share your reactions to the toolkit in general.</p> <p>B. Please share your ideas to develop a personal fall prevention plan.</p>