

Modifications of Homes for the Comfort of Arthritis Sufferers

by

Stephanie E. Wenning

A PROJECT

Submitted to

Oregon State University

University Honors College

in partial fulfillment of
the requirements for the
degree of

Honors Baccalaureate of Science in Interior Design (Honors Scholar)

Presented May 23, 2011

Commencement June 2011

AN ABSTRACT OF THE THESIS OF

Stephanie E. Wenning for the degree of Honors Baccalaureate of Science in Interior Design
presented on May 23, 2011. Title: Modifying Homes for the Comfort of Arthritis Sufferers

Abstract approved: _____

Carol Caughey

This study explores the awareness of features in homes that could potentially improve the quality of life for those with arthritis. Little research has been published on the subject of home modifications for arthritis sufferers. For this study, several features for the home were identified as potentially helpful in the lives of those with arthritis. Each one was ranked by survey participants for helpfulness in their own lives. Participants were also asked about their awareness of such features and whether or not they would use them and why. The results suggest that some people who have arthritis are not aware of these features. Most participants (65%) indicate that they found nearly all of the features to be either helpful or very helpful. The results of the study indicate a need to raise awareness of such features because they have the potential to improve the quality of life for those with arthritis.

Key Words: Interior Design, Arthritis, Features, Pain Reducing, Home Modifications

Corresponding email address: wennings@lifetime.oregonstate.edu

© Copyright by Stephanie E. Wenning
May 23, 2011
All Rights Reserved

Modifications of Homes for the Comfort of Arthritis Sufferers

by

Stephanie E. Wenning

A PROJECT

Submitted to

Oregon State University

University Honors College

in partial fulfillment of
the requirements for the
degree of

Honors Baccalaureate of Science in Interior Design (Honors Scholar)

Presented May 23, 2011

Commencement June 2011

Honors Baccalaureate of Science in Interior Design project of Stephanie E. Wenning presented on May 23, 2011.

APPROVED:

Mentor, representing Interior Design

Committee Member, representing Housing Studies

Committee Member, representing Disability Access Services

Department Head, representing Design and Human Environment

Dean, University Honors College

I understand that my project will become part of the permanent collection of Oregon State University, University Honors College. My Signature below authorizes release of my project to any reader upon request.

Stephanie E. Wenning, Author

ACKNOWLEDGEMENTS

There would have been no thesis without the aid of those who contributed to it. I would like to express my endless gratitude to Carol Caughey, my mentor, for her tireless efforts in reading, editing, and improving this thesis. I would also like to thank her for her many suggestions for research, knowledge about the subject, enthusiasm, guidance, and support. Additionally, I would like to thank the members of my thesis committee, Carmen Steggell and Gabriel Merrell, for their knowledge on the subject and time dedicated.

This study would not have been possible without Debbie Jensen for helping to send the survey and email to the College of Health and Human Sciences graduate and undergraduate list serves. Thanks to her and all participants who took the survey.

TABLE OF CONTENTS

CHAPTER I: INTRODUCTION.....	1
The ADA and ADAAG.....	1
Universal Design.....	2
Aging in Place.....	3
Increasing Incidence of Arthritis.....	4
Arthritis Foundation.....	5
Purpose of Study.....	5
CHAPTER II: LITERATURE REVIEW.....	6
Accessibility Laws.....	6
Universal Design.....	8
Designing for Aging.....	10
Features in the Survey.....	11
Arthritis and Accessibility.....	12
CHAPTER III: METHODOLOGY.....	15
Survey.....	15
Assumptions.....	16
Data Collection Instrument.....	16
Participants.....	17
Demographics.....	17
Procedure.....	18
Limitations.....	18

TABLE OF CONTENTS (continued)

Statistical Analysis.....	19
CHAPTER IV: RESULTS.....	20
Question 1.....	21
Question 2.....	21
Question 3.....	21
Question 4.....	23
Question 5.....	30
Question 6.....	30
Question 7.....	31
Question 8.....	32
Question 9.....	33
Question 10.....	34
CHAPTER V: DISCUSSION.....	35
Hypothesis one (H ₁).....	35
Hypothesis two (H ₂).....	35
Hypothesis three (H ₃).....	35
Hypothesis four (H ₄).....	36
What do the Results Mean?.....	37
Reliability and Limitations.....	38
Interpretation.....	40

TABLE OF CONTENTS (continued)

Suggestions for Future Research.....	40
Conclusions.....	41
BIBLIOGRAPHY.....	43
APPENDICES.....	44
Appendix A Survey.....	45
Appendix B Pictures of Features in Survey.....	50
Appendix C Raw	
Results.....	56szzs

LIST OF FIGURES

Figure

4.1	Participants' current use of feature.....	21
4.2	Participants' explanations for currently having no features in their homes.....	22
4.3	The ratings of helpfulness for having no steps at the entry of the home.....	23
4.4	The ratings of helpfulness for having no steps inside the home.....	23
4.5	The ratings of helpfulness for having a compact and efficient floor plan.....	24
4.6	The ratings of helpfulness for having grab bars near the toilet.....	24
4.7	The ratings of helpfulness of grab bars in the bathtub and shower.....	24
4.8	The ratings of helpfulness of a seat in the shower.....	25
4.9	The ratings of helpfulness of higher than standard (about 4 inches) toilets.....	25
4.10	The ratings of helpfulness of lever-like door handles instead of spherical knobs.....	25
4.11	The ratings of helpfulness of a waist-height oven.....	26
4.12	The ratings of helpfulness of carpet instead of hard flooring.....	26
4.13	The ratings of helpfulness of lever-like faucet handles instead of spherical knobs.....	26
4.14	The ratings of helpfulness of only one handle on faucets instead of one for hot and one for cold.....	27
4.15	The ratings of helpfulness of a walk-in shower or shower stall instead of a shower/tub combo.....	27
4.16	The ratings of helpfulness of chairs with full arms and space underneath for feet to aid in standing.....	27
4.17	The ratings of helpfulness of soft mats in the kitchen and other heavily-used areas in the home.....	28
4.18	The ratings of helpfulness of casement windows with easy-to-grab handles.....	28
4.19	The ratings of helpfulness of rollout drawers instead of deep cabinets.....	28

LIST OF FIGURES (continued)

Figure

4.20	The open-ended responses from participants regarding features they would use in their homes.....	30
4.21	The responses of whether respondents were aware of such features before taking the survey.....	31
4.22	Participants' years with arthritis and its severity.....	31
4.23	Participants' age in relation to severity of arthritis.....	32
4.24	The dispersal of residence types among respondents.....	33

LIST OF TABLES

Table

4.1	Sample of respondents.....	20
4.2	The average scores out of 85 for the features based on the severity of arthritis.....	29
4.3	The average scores out of 85 for the features based on age.....	29
4.4	The average scores out of 85 for the features based on years with arthritis.....	29
4.5	Years in residence broken up by age.....	33

DEDICATIONS

I dedicate this thesis to my grandparents, Mamere and Poppy, without whom this degree would never have been possible. Thank you for all of your love and support. I love and miss you.

I would like to thank my parents, Paul and Valerie for all of their love, dedication, support, help, faith in me, and belief in what I am capable of. Thank you for all that you do for me. Thank you to Jennifer, my sister and best friend, for her love and shoulder to lean on. And to Matt, my rock, for being there for me when life was the hardest and for sharing in the wonderful times.

CHAPTER I

INTRODUCTION

Arthritis is a condition that affects the joints in which cartilage is worn down either by the body's own immune system or through excessive use throughout the years. Many people suffer from several kinds of arthritis and depend upon medication, exercise, and diet to maintain control of their symptoms. It is possible, however, to design the environment in such a way that pain is reduced and quality of life is improved for arthritis sufferers.

The design of the built environment, when well done, can affect people's health and welfare, keep us safe, and make life more enjoyable (American Society of Interior Designers). The choices of materials, appliances, and layout in buildings have a great impact on humans. The pain, difficulty, and fatigue associated with arthritis can be minimized if one uses professional interior and lighting design and features now widely available due to many codes and laws such as the ADA (Americans with Disabilities Act). The problem confronting those who could benefit from these design features for pain control is that they are usually not aware of them. The purpose of the present study is to explore the level of awareness among those with arthritis of these environmental modifications and how helpful they might find them.

The ADA and ADAAG

The Americans with Disabilities Act is a federal civil law, passed in 1990, intended to reduce discrimination against those with disabilities (Harmon & Kennon, 2008, p. 433). The law is enforceable regardless of code jurisdictions, and compliance is required in public

accommodations and in some residential buildings (under certain occupancy classifications in the International Building Code). This can include, but is not limited to, places of hospitality,

public transportation, public places of gathering, such as city buildings and auditoriums, and medical offices, hospitals, and barber shops (Harmon & Kennon, 2008, p. 433).

The Americans with Disabilities Act Accessibility Guidelines (ADAAG) “give designers specific design criteria for accessibility in all aspects of interior and architectural design” (Harmon & Kennon, 2008, p. 435). These guidelines were the basis of the ADA requirements. They cover scoping requirements, such as how many accessible features like toilets are needed depending on the type and size of the building. They also deal with technical requirements, such as specific dimensions and measurements that make features accessible (Harmon & Kennon, 2008, p. 435). In keeping with these guidelines, any building of any type and any occupancy should provide the “highest level of accessibility” (Harmon & Kennon, 2008, p. 436). The ADA, as well as the next two principles discussed (Universal Design and Aging in Place), have affected many buildings and codes. However, the ADA is limited and addresses only basic modifications. Focus on additional accommodations is needed to provide a fully accessible environment.

Universal Design

Universal Design, a term coined in the 1980s, can be defined in several ways. Architect Ron Mace in 1985 defined it as “the design of products and environments to be usable by all people to the greatest extent possible, without the need for adaptation or specialised design.” Another definition describes Universal Design as architectural and interior elements and other products being designed to be used by the greatest number of people possible (Björk, 2009, p. 118).

Essentially, Universal Design refers to design (of interiors, buildings, appliances, fixtures, furniture, and so forth) that is conscious of the different abilities of the population. A not

insignificant proportion of the population (estimated 15-20%) has one disability or another (Björk, 2009, p. 118). Sometimes, however, ADA regulations are not enough to make living situations livable for all people. Universal Design expands design to include all people. This means that design serves more than those in wheelchairs but also those who are blind, deaf, mute, on crutches, with walkers, have autism, have diabetes, or have Multiple Sclerosis, arthritis, Down's Syndrome and so on. Instead of design for "the handicapped", Universal Design means that buildings are accessible and aesthetically pleasing to all people (Stone, 1998, p. 12).

Aging in Place

Aging in place is a relatively new term which refers to aging people staying in their homes rather than moving to institutional housing such as assisted living facilities or nursing homes (Bookman, 2008, p. 419). Remaining in the homes and neighborhoods they're accustomed to instead of going into age-segregated communities is a benefit that many aging people prefer. A large portion of the aging population (78 percent of those 50-64 years old, 91 percent of those 65-74 years old, and 95 percent of those older than 75) indicate that they would like to continue living in their homes instead of moving into institutional housing (Pynoos, 2009, p. 26). Furthermore, 32 percent of households in America have someone aged 60 or more living there (Pynoos, 2009, p. 26). With statistics like these, it makes sense to incorporate adaptable design in all homes.

In order to encourage designers and builders to design with the aging population with disabilities in mind, the U.S. Green Building Council awards a point in its LEED certification for "universal accessibility" (Pynoos, 2009, p. 28). Furthermore, the Inclusive Home Design Act will make visitability required in new homes (Pynoos, 2009, p. 28). The Act has unfortunately been

stalled in Congress since 2008. This is yet another indicator we have much left to do to make homes accessible for all users.

Increasing Incidence of Arthritis

There are several types of arthritis (rheumatoid, osteo, psoriatic, and gout, among others) and the numbers of adults with the disease is rising. According to Davis in 2010, the Center for Disease Control and Prevention (CDC) has reported an increase of nearly 4 million people with doctor-diagnosed arthritis in America over a four-year period (Davis, *More Americans Limited by Arthritis Pain*). This statistic is staggering, yet unfortunately not surprising. Some predicted that the percentage of the population with arthritis (currently 22 percent) would rise as baby boomers age and as American obesity increases (Davis, 2010). Not all arthritis sufferers, however, are handicapped by the disease. Twenty-one million people with arthritis, about 10% of those with it, indicated that it limited daily activities (Davis, 2010). The other 90% have the arthritis under control, at least to some extent, through medication and exercise (Davis, 2010).

Although there is no direct proof that they are causally related, there is also a recent rise in the rate of obesity. One in three obese people has arthritis, which is a higher percentage than those of a “normal” weight (Davis, 2010). The combination of obesity and joint pain is almost guaranteed to produce difficulty in performing many tasks, whether it has been formally diagnosed as arthritis or not. However, exercise and movement are helpful for relieving joint pain (Davis, 2010) and having special, professionally designed features in the home also has the potential to reduce discomfort and increase mobility.

The Arthritis Foundation

The Arthritis Foundation is a non-profit organization that supports research in the many types of arthritis and related conditions (Arthritis Foundation, 2011). It was founded in 1948 and is the largest contributor to research on arthritis (Arthritis Foundation, 2011). Furthermore, it aids those with arthritis by providing education about the disease, working with public policies and legislation, and trying to improve the quality of life for those with arthritis through evidence-based research (Arthritis Foundation, 2011). It also has a magazine available for free.

Purpose of the Study

A search for studies about designing for those with arthritis revealed little research on this topic. Although there is a great deal of available information on Universal Design and Aging in Place, information about disease-specific design (in particular, arthritis) is very limited. The purpose of this study is to explore attitudes about various features of the interiors of homes which may improve the quality of life for those with arthritis.

The four hypotheses of this study are:

H₁: Some people with arthritis are not aware of the aids that could potentially help them.

H₂: People may not use the aids because of factors in their living situations.

H₃: People may not use the aids because their arthritis is not severe enough yet.

H₄: When the participants have seen the list of possible aids, they will indicate that these aids would be helpful.

CHAPTER II

LITERATURE REVIEW

An extensive search of the literature turned up few results for adapting homes for those with arthritis. With little guidance from previous studies, it became clear that a preliminary study was in order. However, the literature relating to design for the elderly, for disabilities, and Universal Design has provided a basis for this study.

Accessibility Laws

In commercial interior design, it is always important to keep every potential user in mind. To aid designers in doing so, a federal law, the Americans with Disabilities Act, was signed by the President in 1990. This law is meant to stop discrimination against those with disabilities in jobs, accommodations, and public transportation. Approximately 50 million Americans have a disability (which could be physical, mental, sensory, or cognitive) (Rhoads, 2010, p. xv). In 1973, the U.S. Access Board was formed in order to develop guidelines to ensure that accessibility was achieved. The Americans with Disabilities Act Accessibility Guidelines (ADAAG) were not adopted until 1991. ADAAG covered accessibility in some private and all public (nonfederal) entities. The guidelines for federal buildings are different and come from the Architectural Barriers Act (ABA), which became law in 1968 (Rhoades, 2010, p. xv). In 2004 both sets of regulations were compiled in order to create a more thorough and up-to-date set of guidelines (Rhoades, 2010, p. xv). Until the ABA in 1968, accessibility in commercial buildings was not considered necessary, if it was even considered at all. Today, it is illegal to design a building that is not accessible to as many users as possible. It is important to note that the ADA is not a building code, but rather a civil rights law and thus is enforced by federal authorities.

Some accommodations that are for the most part considered to be public do not have to comply with the ADA. These include (but are not limited to) facilities owned by religious entities, churches, private clubs, some specific government buildings, and one-to-three unit dwellings (Harmon & Kennon, 2008, p. 434). This means that many buildings in the United States are not required to follow an accessibility code for people with disabilities, though it is possible that they are still accessible.

The movement to gain accessibility in public buildings began in earnest during the Civil Rights Movement in the 1960s when the American National Standard Institute (ANSI) held that disabled persons should have access to all public buildings (Rhoades, 2010, p. xvi). The ADA is divided into “Titles” that deal with different aspects of the design. They deal with both new construction and remodeling of interiors (Rhoades, 2010, p. xvii).

Not only must the design of the buildings and interiors be accessible to those with disabilities, but the ADA also requires that “policies, practices and procedures that affect the ability of a disabled individual to use its services” (Harmon & Kennon, 2008, p. 434) be made accessible to all patrons. This is another step to ensure that those with disabilities are recognized and can therefore lead lives with the freedom that others enjoy (Rhoades, 2010, p. xvii).

The ADA (Americans with Disabilities Act) is the federal law and the ADAAG (Americans with Disabilities Act Accessibility Guidelines) is a collection of the rules and regulations one must follow in order to comply with the law. It includes such things as dimensions and materials to incorporate in the design of public buildings. For the most part, these specifications and the word “accessibility” refer to making buildings wheelchair accessible. While there are other guidelines that incorporate other disabilities, such as sensory and mental, the ADA largely covers

physical disabilities such as limited mobility, hearing disabilities, blindness, and low vision. These accommodations include, but are not limited to ramps, wider hallways, toilet stalls sized for a wheelchair, five foot turning circles at corners, grab bars, and sinks with knee space underneath. Following these guidelines is important, not just to avoid potential lawsuits, but in order to make every user of the space feel welcome and comfortable.

Universal Design

Universal Design is not a new concept but it has become generally accepted recently by the architecture and design community. While the ADA deals with the legal side of disability discrimination and ensures that public buildings are accessible, Universal Design relates to making spaces easy to use for everyone, of every age, not only those with disabilities.

According to Mary Jo Peterson, an interior designer who is an advocate for Universal Design, one of several important differences between Universal Design and the ADA is the emphasis on aesthetic appeal (Quoted in Peck, 2002). Attempting to reduce the institutional appearance of grab bars and other such equipment (Peck, 2002), Universal Design promotes accessibility and aesthetics at the same time (Björk, 2009, p. 118). The main point of Universal Design is that children, tall people, people using walkers, and all of us can use it. However, Mary Jo Peterson goes on to say that an underlying tenet of Universal Design to make a home accessible and easy to use while still looking like a home and not a commercial building is perhaps just as important (Peck, 2002, p. 17). When someone has difficulty with a product or design because of a disability, it produces in him or her feelings of anxiety and frustration (Björk, 2009, p. 117). Minimizing those feelings for people with disabilities (54 million Americans in 1998 according to

Stone) is extremely important and should be a focus in both residential and commercial design. Improving the aesthetics could help with this goal (Peck, 2002).

While it is difficult to see Universal Design as a bad idea, costs for such designs can be prohibitive (Stone, 1998). However, according to architects with experience in such matters, including Universal Design features in an original plan adds only 1-2% to the total cost and often increases the resale value of the property (Stone, 1998).

Often Universal Design depends upon trial and error; if something is found to be effective for people with disabilities without making them feel singled out, it becomes part of Universal Design (Stone, 1998). Seven important principles developed by one of the pioneers of Universal Design, Ron Mace, are: equitable use, flexible use, simple and intuitive use, perceptible information, tolerance for error, low physical effort, and appropriate size and space for use (Stone, 1998). These principles should guide all design, whether for the able-bodied or those with disabilities. The seven principles of Universal Design, developed by Ron Mace and other architects, product designers, engineers, and environmental researchers are as follows:

- * Principle 1: Equitable Use. The design is useful, appealing, and marketable to people with diverse abilities. No group is stigmatized.
- * Principle 2: Flexibility in Use. For example, it can be used by the left or right hand; it is adaptable to a user's individual pace.
- * Principle 3: Simple and Intuitive Use. The design is easy to understand, regardless of experience, knowledge, language skills, or concentration levels. All information needed for use is logically arranged.
- * Principle 4: Perceptible Information. The design employs different modes of conveying essential information. For example, pictorial instructions to overcome language barriers. Large print for those with low vision. Flashing lights for people who are hard of hearing.
- * Principle 5: Tolerance for Error. The design minimizes hazards and adverse consequences of accidental or unintended actions.
- * Principle 6: Low Physical Effort. Everyone needs to save energy! Minimizing sustained effort is, perhaps, one of the most important principles for those of us living with MS. Think of a shower with a built-in seat, for

example.

* Principle 7: Size and Space for Approach and Use. Again, a crucial principle for people living with MS as our ability to see, to perform tasks, or to get around varies tremendously from time to time. The detailed guidelines cover reachability regardless of the user's body size, posture, or degree of mobility. It also means providing adequate space for the use of assistance, whether human or mechanical. (Stone, 1998, p. 13)

While for the most part these principles are appropriate for people with arthritis, design for a specific disability takes additional research.

Designing for Aging

Aging in place is another concept that is not new but has come to the attention of the public because of aging baby boomers. It is the idea of adapting a home in order to facilitate easier living situations when mobility and sensory perception begin to decline. More than creating a new design, aging in place focuses on making a well-known and well-loved home more appropriate for its occupants. Additionally, it is important to pay attention to neighborhoods, in order to make them elderly friendly. Bookman points out that it is important to consider the community around the home, in order to make daily life and errands easier to accomplish (2008, p. 422). This can be done by locating homes near work and other often-used services (such as parks, churches, and grocery stores) (Bookman, 2008, p. 422). For the aging population and others with disabilities, long commutes can be troublesome and make aging in place difficult. Bookman goes on to say that building neighborhoods that are not segregated by age and are not inherently ageist and focusing on the placement of homes in relation to these commonly frequented public buildings can help make a community much friendlier for aging in place.

Adaptations for aging in place include many of the same features as Universal Design. Designing for aging in place is more than just making a home accessible for wheelchairs and walkers. It

involves doing such things as improving lighting, removing slippery surfaces, and adding grab bars in the home (Pynoos, 2009). Attempting to focus on the most utilized areas of the home such as kitchens and baths is most important (Pynoos, 2009, p. 27). Additional lighting (task and ambient) to non-slip floors, hand rails, grab bars, flashing light alarms, and water heater controls are just some of the options in adapting homes for aging in place. We are not all the same—we age differently. Some lose sight, others hearing, some are crippled by physical pain, others by excess weight. With many of these features and devices now commonly available in retail stores, it has become relatively easy to adapt homes for the aging population. Modifications to existing homes should be directed at areas that would be most beneficial to the occupants. This takes research on the part of the designers, and attentiveness to their clients' needs, which is often the most difficult part of adapting homes for aging in place (Pynoos, 2009, p. 27).

Finally, an important aspect to consider in all homes is visitability. "Visitability" is the idea that any home should be accessible for visits by those with disabilities, thus improving their ability to leave their own homes. This includes an accessible bathroom (Pynoos, 2009, p. 28). "Visitable" homes have few barriers at the entry, are easy to get around in, and are not only easier for the aging population, but they can accommodate all visitors.

Features in Survey

After reviewing aids, the student researcher decided to include the following 17 features to be rated for helpfulness in the survey (photos for many can be found in Appendix B):

1. No steps at the entry of the home.
2. No steps in the interior of the home.
3. Compact and efficient floor plan.

4. Grab bars near the toilet.
5. Grab bars in the tub.
6. Shower seat.
7. High Toilets (approx 4 inches higher than the standard height).
8. Lever-like door handles instead of spherical knobs.
9. Waist-height oven.
10. Carpet instead of hard flooring.
11. Lever-like faucet handles instead of spherical knobs.
12. One-handed faucets instead of one for hot and one for cold.
13. Walk-in shower or shower stalls instead of shower/tub combo.
14. Chairs with full arms and space underneath for your feet for support when standing up.
15. Soft mats near the kitchen sink and other heavily-used areas.
16. Casement windows with easy-to-grab handles.
17. Rollout drawers instead of deep cabinets.

Arthritis and Accessibility

Arthritis comes in approximately 35 forms, all of which affect the joints and cause stiffness and pain (Arthritis Foundation, 2011). Two of the most common types are rheumatoid arthritis and osteoarthritis (Arthritis Foundation, 2011). Rheumatoid arthritis is an autoimmune disease, meaning a disease in which the immune system that is designed to protect the body from viruses and bacteria instead attacks the body itself. It attacks the synovium that lines joints to prevent bone from rubbing on bone, causing fluid to build up in the joints, which causes inflammation and pain (Arthritis Foundation, 2011). It is a systemic and chronic disease meaning it occurs throughout the body and cannot be cured (Arthritis Foundation, 2011). Early diagnosis

can help prevent joint and organ damage and disability (Arthritis Foundation, 2011). Symptoms vary from person to person and even day to day. Joints can feel warm to the touch, be painful, have a loss in range of motion, and inflammation. Fatigue, anemia, and low grade fevers are all common (Arthritis Foundation, 2011). The exact cause of this disease is not known but most agree that it involves a combination of genetics and environmental factors (Arthritis Foundation, 2011). It affects men and women of all ages and ethnicities from all over the world, though 70% of those with the disease are women, leading researchers to believe that a female hormone may be involved in its onset (Arthritis Foundation, 2011).

Osteoarthritis is another chronic disease that is the wearing down of cartilage, the cushioning at the ends of bone, in the joints (Arthritis Foundation, 2011). The breaking down of the cushioning causes bones to rub against each other which then causes pain and stiffness (Arthritis Foundation, 2011). There are two types of osteoarthritis, the first being characterized by aging and general wear and tear (though it is important to note that not everyone who is aging has osteoarthritis) (Arthritis Foundation, 2011). Another type, known as secondary osteoarthritis, is caused by trauma to a joint or obesity (Arthritis Foundation, 2011). Joints typically affected by osteoarthritis are the knees, hips, hands, and shoulders. Other joints are very rarely affected (Arthritis Foundation, 2011). The disease is characterized by pain and stiffness in the affected joints (Arthritis Foundation, 2011). While the exact causes of this disease are not known and most likely depend on several factors, those factors are believed to be age, weight (specifically obesity), overuse of or damage to joints, heredity, and muscle weakness (Arthritis Foundation, 2011). It is important to note that this study deals with all types of arthritis and respondents were not asked what type of arthritis they had, but just its severity and how long they had it.

As the American population is both aging and gaining weight (Davis, 2010), the incidence of arthritis (more specifically osteoarthritis as it is directly related to those two factors) is increasing, too. Numbers are already much higher than previously projected and they are expected to continue to increase (Davis, 2010). Using the principles and ideas from the ADA, Universal Design, and aging in place, it would not be difficult to attempt to improve the quality of life for those with arthritis by manipulating their near environment. As Stone points out, the cost of such design features only increases construction costs by only about 1-2% (Practical Beautiful, Humane, 1998). Furthermore, the aids and features that could potentially help these people are widely available, thanks to recent awareness and focus on them.

From ADAAG, we see many aids such as raised toilet seats, shower seats, roll-in showers with no barriers, and work stations and countertops with knee room underneath for seated work. Because of the fatigue and pain experienced by arthritis patients, many of these aids and devices can ease daily life for them as well as for people with other disabilities.

Universal Design often depends upon trial and error; devices that work are often adopted as useful for large groups of people. With new knowledge of features and devices available, it is possible for arthritis sufferers to try them out and see how they work in regard to improving their lives. The design of such features does not have to look industrial, with metal grab bars and plastic shower seats, but rather it can be made aesthetically pleasing.

Through using the concepts of aging in place and Universal Design, we can make adjustments to existing homes that alleviate the inconveniences of daily life with regard to arthritis.

CHAPTER III

METHODOLOGY

Arthritis is a disease that causes various disabilities. While there are codes and laws to protect those with disabilities and help designers create accessible buildings, they do not focus on diseases such as arthritis and what could help improve the quality of life for arthritis patients. While they may not be confined to wheelchairs or need many accessibility aids included in the ADA for public buildings, they do have special needs.

No existing studies were found that focused on arthritis as a factor in residential design. An hypothesis underlying the present study is that people with arthritis are unaware of the assistive devices and modifications in homes that could improve the quality of their lives and reduce their pain.

Survey

The purpose of the present study was to explore the extent of knowledge of available features that might improve the quality of life of those with arthritis. The online survey used a Likert-type scale for participants to rank possible features available for use in the home. The participants were asked to rate each one as Not Helpful, Somewhat Helpful, Neutral, Helpful, or Very Helpful. They were also asked about their current living situation and whether they currently have any features to aid in their daily lives. They were asked what aids they currently have, which features they would choose to have in the future, whether they were aware of these features before the survey, the severity of their arthritis, their sex, and their age at their last birthday. The features to be ranked on the Likert scale were chosen by the student researcher

based on features in the ADA, Universal Design, and aging in place, as well as on personal experience with arthritis. The hypotheses of this study were:

H₁: Some people with arthritis are not aware of the aids that could potentially help them.

H₂: People may not use them because of factors in their living situations.

H₃: People may not use them because their arthritis is not severe enough yet.

H₄: When the participants have seen the list of possible aids, they will indicate that these aids would be helpful.

Assumptions

Assumptions included: 1) Participants self-identified as having been diagnosed with arthritis and 2) They were not familiar with interior design codes, the ADA, Universal Design, or aging in place.

Data Collection Instrument

A web-based survey tool, [surveymonkey.com](https://www.surveymonkey.com), was used for data collection. This online program was a convenient way to generate the survey, distribute it, and collect and analyze data. Participants were asked to respond to nine questions, plus the Informed Consent. The last four questions were demographic, such as age, gender, residences and the severity of their arthritis. There were multiple choice and fill-in questions, plus ranking questions that used a Likert-type scale. The respondents were allowed to skip any question they wished because some questions may have been seen as too personal. There were four separate pages or screens in the survey. The first was the consent, which was required in order to continue. The second page included questions about current knowledge of or use of several devices or modifications. The third page

was the list of features as well as an open-ended question about which ones the subjects would be most likely to put in their homes. In addition to demographic information, the fourth page asked whether they knew about any of these aids before taking the survey. See Appendix A for survey.

Participants

Demographics

The participant pool in this study was composed of Oregon State University students, both undergraduate and graduate, in the College of Health and Human Sciences during Winter Term 2011. In addition, a small group of personal contacts of the student researcher also responded to the survey. The age range of these participants was 18-24 and 33-70. No one who gave their age fell outside these two ranges. The reason for choosing these two pools of participants was to ensure that the survey would reach many potential participants (through the list serves) as well as to ensure that many people who actually had arthritis would respond (through the personal contacts).

The students majoring in Housing Studies and Interior Design are familiar with the ADA, Universal Design, and aging in place and therefore would have knowledge of such guidelines and features, possibly influencing their awareness and rating of helpfulness. Those receiving a certificate in Gerontology have a level of knowledge and awareness of these features as well. Because the survey did not ask for the participants' majors, or even whether they were students or the personal contacts of the student researcher, it is impossible to know what levels of knowledge the respondents brought to the survey. It must be assumed that at least some of the participants had such a level of knowledge.

Procedure

A recruiting email was sent to the list serve for the undergraduate and graduate students in the College of Health and Human Sciences inviting them to participate in a study about improving homes for those with arthritis. This same email was sent to the student researcher's personal contacts who had previously volunteered to take part in the study. The email included the web link to the survey. Participants were given two weeks from receipt of the email to complete the survey and informed that only the first fifty responses were to be analyzed for the study. The survey program assigned a number to each participant, thus ensuring anonymity. The email appeared as follows.

Subject: A survey about living with arthritis

Content: Would you like to be part of a research study regarding arthritis, well-being, and your home?

The survey will take 15 minutes or less. You will be asked questions about your home, features in it, and your knowledge of available features that might improve your quality of life with regards to pain.

You must be 18 years or older in order to take the survey and self identify as having been diagnosed with arthritis.

Please follow this link to take the survey: <http://www.surveymonkey.com/s/ZNR6JTC>

Limitations of the Online Survey

While the website used, [surveymonkey.com](http://www.surveymonkey.com), made it easy to create the survey, distribute it, and analyze the results while maintaining anonymity for the participants, the free membership had limitations. Only ten questions were allowed, and one of those was used for the online consent. Therefore some questions were combined with others. Furthermore, the program did not cross-

tabulate the responses, so statistical analysis of the data was limited. Lastly, accepting only the first 50 responses was limiting. It could potentially have excluded people who had arthritis and did not use computers often, or who procrastinated for another reason.

Statistical Analysis

The student researcher entered the data on an Excel spreadsheet and made statistical graphs. Most of the results in the survey were not yes or no answers and were somewhat subjective; therefore complicated statistical tests were not as necessary as comparing the responses of the participants. Some responses were cross tabulated and presented in easily readable pie charts and graphs.

CHAPTER IV

RESULTS

The purpose of this study was to explore various features of the interiors of homes which may improve the quality of life for those with arthritis. Furthermore, the purpose was to explore the level of knowledge of those features among those with arthritis and how helpful they find the features. Because a literature search turned up no results about interior design and arthritis, the student researcher saw a gap in the resources available to assist those with arthritis in improving the quality of life. Table 4.1 shows the age and sex of participants (among those who responded to those items).

TABLE 4.1: Sample (n=20)

	18-24	33+	Total
Males	0	4	4
Females	9	7	16
Total	9	11	20

Although a total of 43 respondents took the survey, only 20 provided demographic information. Six respondents answered only the first, mandatory question (the consent), and 14 respondents answered only the next one or two questions (about whether or not they have features in their homes and why or why not). Of those who did give demographic information, 55% (n=11) were aged 33 years or older and 45% (n=9) were aged 18-24 years. Twenty percent were male (n=4) and 80% (n=16) were female. Three of the 18-24 year olds acknowledged that they did not have arthritis. Furthermore, seven participants who did not provide demographic information acknowledged that they did not have arthritis.

Question 1 was the online consent form to ensure the participants were aware of any known risks and benefits and knew whom to contact with any questions regarding survey. A “Yes” answer was required in order to continue.

Question 2: Does your home currently have any devices or design features that facilitate daily activities for someone with arthritis? Check one.

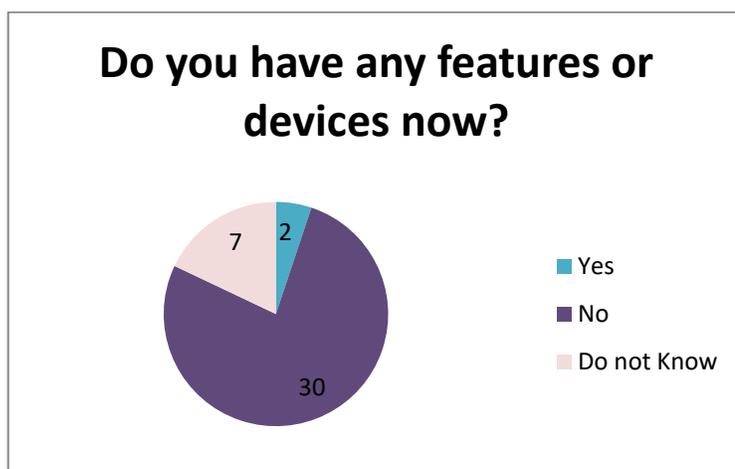


FIGURE 4.1: Participants' current use of features (n=39).

Figure 4.1 summarizes the responses of participants. Of those who answered the question (n=39), 5% (n=2) said they did have features in their home, 77% (n=30) said they did not have features in their home and 18% (n=7) said that they did not know whether they had features or not. Eleven of those who said no and three of those who said they did not know did not complete the survey.

Question 3: If no, why not? If it does, what devices or features does it have?

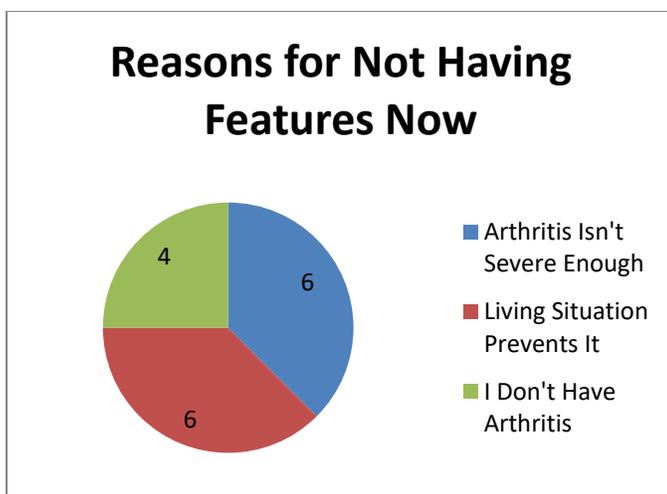


FIGURE 4.2: Participants' explanations for currently having no features in their homes (n=16).

Figure 4.2 show the reasons why participants do not have features now. Although each response was different, it was possible to classify all answers in one of three categories: 1) They do not have arthritis (n=6); 2) Their arthritis is mild enough that the aids are not necessary (n=4); and 3) Their living situation makes it difficult to add such features (i.e. they rent, live in an apartment or residence hall, or their home is older) (n=6).

Interestingly, two people noted that they do have features now, but only one of those answered this question. The participant, a 33 year old with severe to moderate arthritis for 22 years, mentioned several features that were not listed on that page of the survey. Among those features were an ergonomic keyboard, track mouse, carts and laundry baskets with wheels, smart phone for bill paying without writing, a sharp and ergonomic knife, bins instead of hangers and drawers for clothes, a special pull on the refrigerator door, and a Kindle to eliminate carrying books. Items she listed that were on the next page of the survey included lever-like door handles and elevated furniture (specifically a couch and bed).

Question 4: For each of the following features, please indicate whether you think it would be not helpful, somewhat helpful, neutral, helpful, or very helpful. Select the best answer.

For this question there were 17 different items listed, chosen by the student researcher (based on research as well as personal experience), to be ranked on a Likert-type scale. It was a scale of 1-5, 1 being not helpful and 5 being very helpful. Figures 4.3-4.19 show the results for each of the features suggested. For photos of some features see Appendix B.

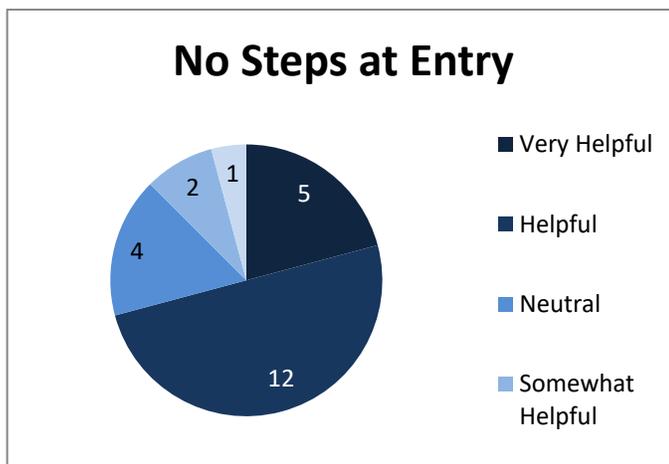


FIGURE 4.3: The ratings of helpfulness for having no steps at the entry of the home (n=24).

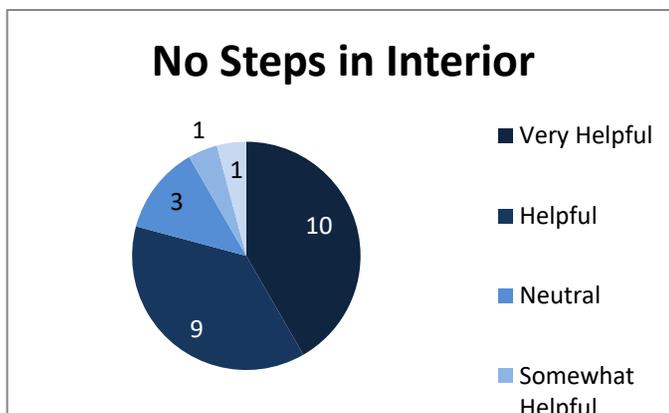


FIGURE 4.4: The ratings of helpfulness for having no steps inside the home (n=24).

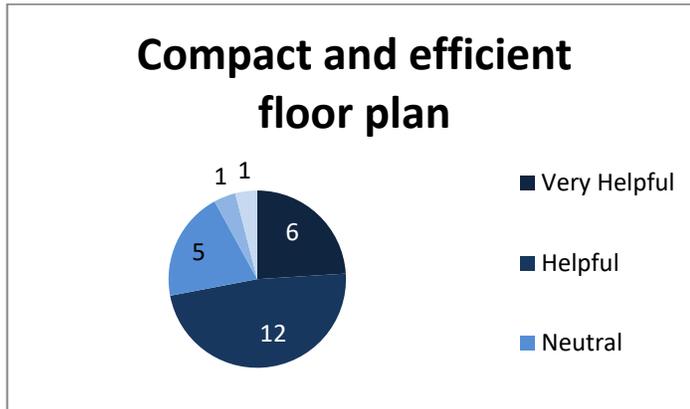


FIGURE 4.5: The ratings of helpfulness for having a compact and efficient floor plan (n=25).

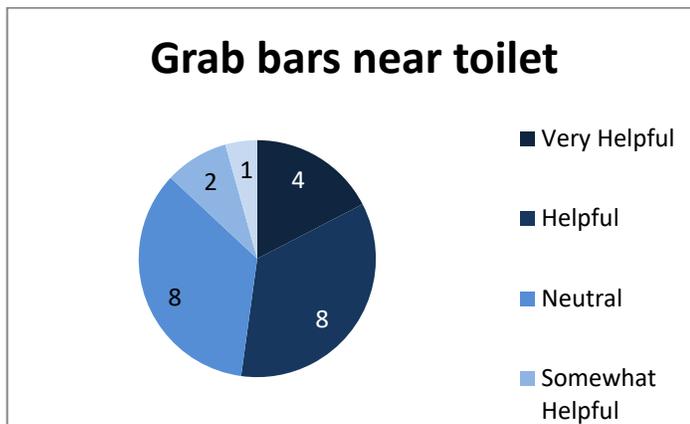


FIGURE 4.6: The ratings of helpfulness for having grab bars near the toilet (n=23).

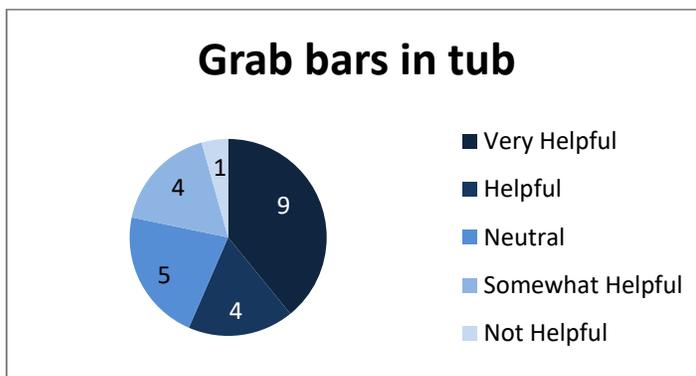


FIGURE 4.7: The ratings of helpfulness of grab bars in the bath tub and shower (n=23).

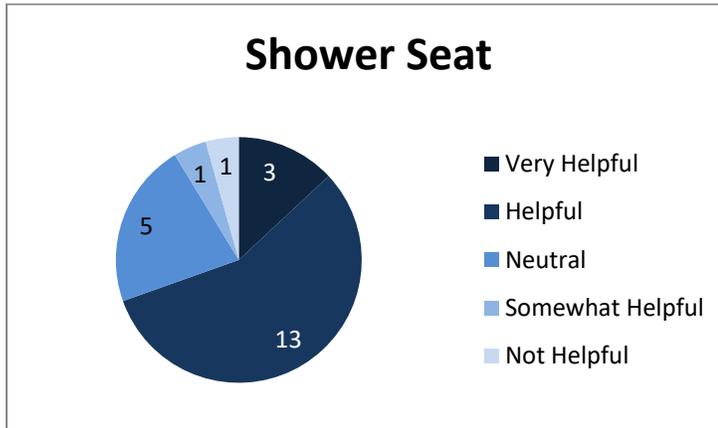


FIGURE 4.8: The ratings of helpfulness of a seat in the shower (n=23).

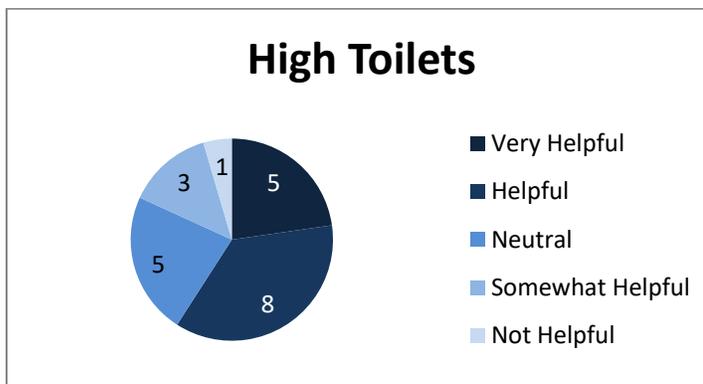


FIGURE 4.9: The ratings of helpfulness of higher than standard (about 4 inches) toilets (n=22).

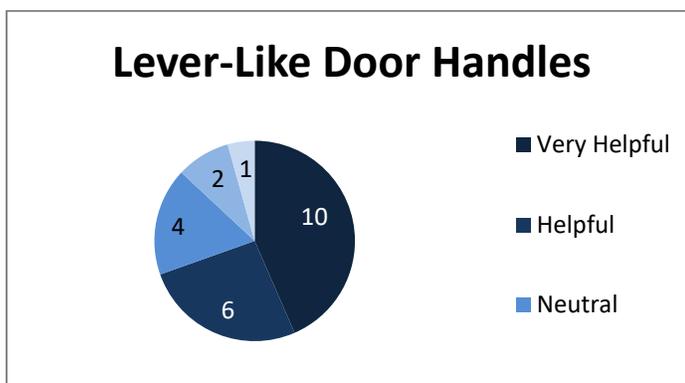


FIGURE 4.10: The ratings of helpfulness of lever-like door handles instead of spherical knobs (n=23).

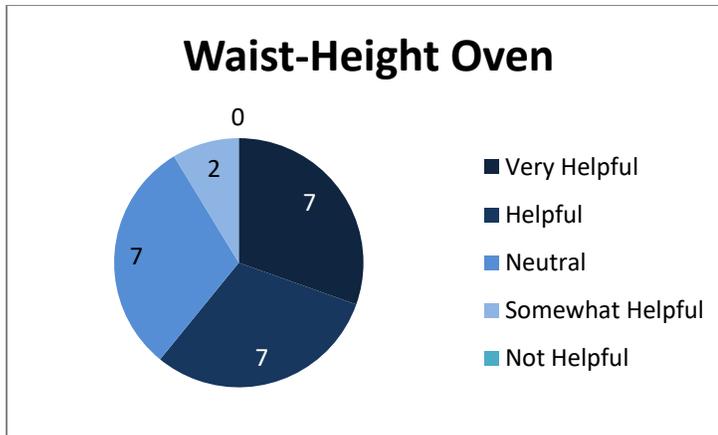


FIGURE 4.11: The ratings of helpfulness of a waist-height oven (n=23).

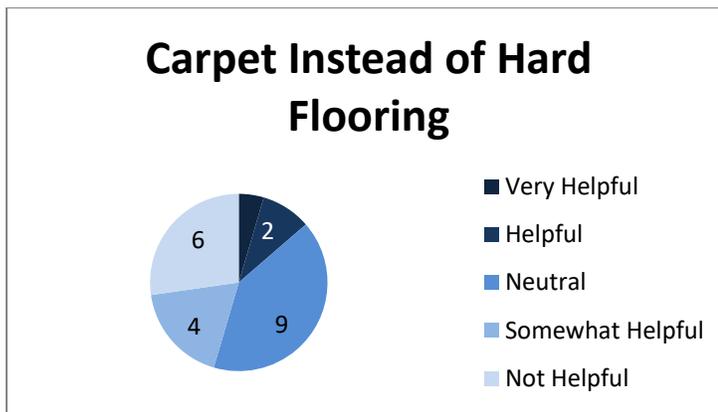


FIGURE 4.12: The ratings of helpfulness of carpet instead of hard flooring (n=22).

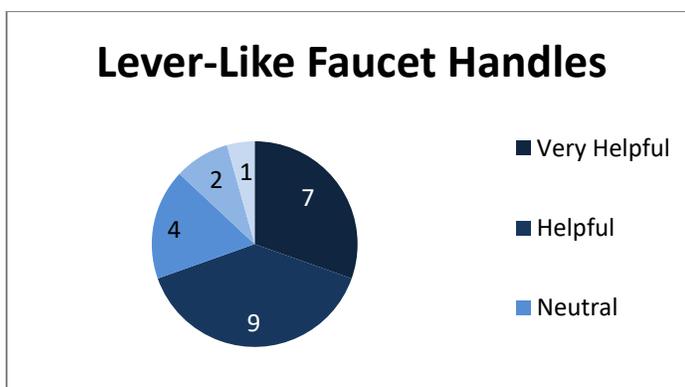


FIGURE 4.13: The ratings of helpfulness of lever-like faucet handles instead of spherical knobs (n=23).

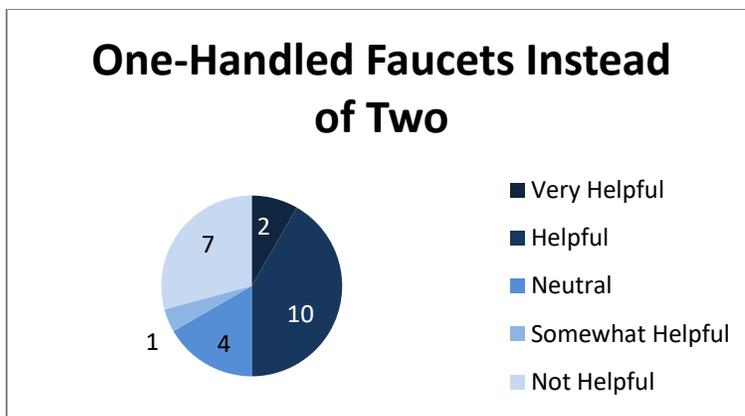


FIGURE 4.14: The ratings of helpfulness of only one handle on faucets instead of one for hot and one for cold (n=24).

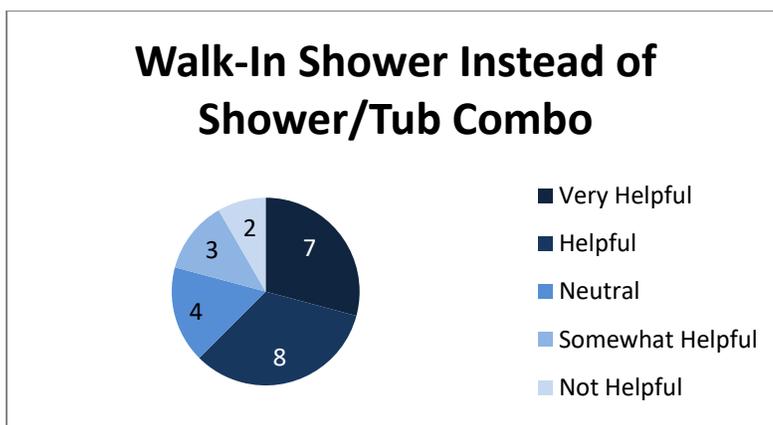


FIGURE 4.15: The ratings of helpfulness of a walk-in shower or shower stall instead of a shower/tub combo (n=24).

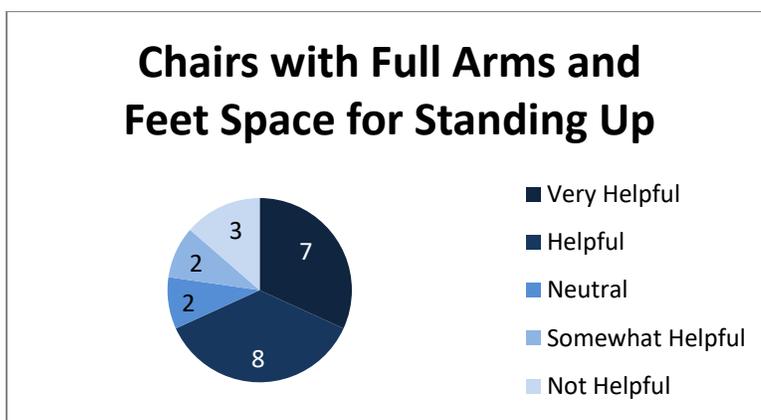


FIGURE 4.16: The ratings of helpfulness of chairs with full arms and space underneath for feet to aid in standing up (n=22).

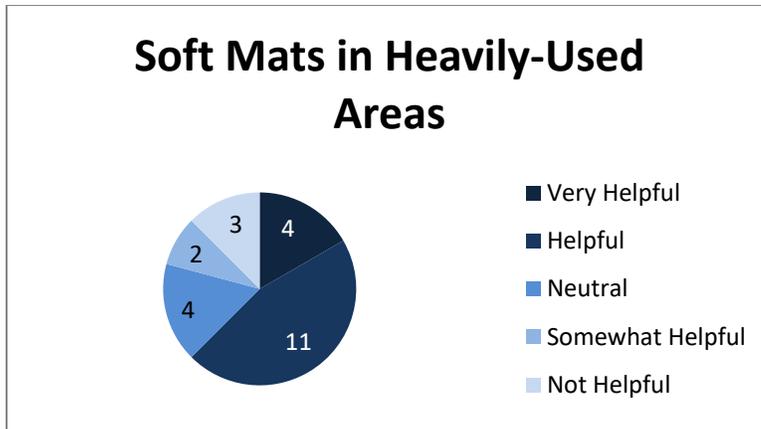


FIGURE 4.17: The ratings of helpfulness of soft mats in the kitchen and other heavily used areas in the home (n=24).

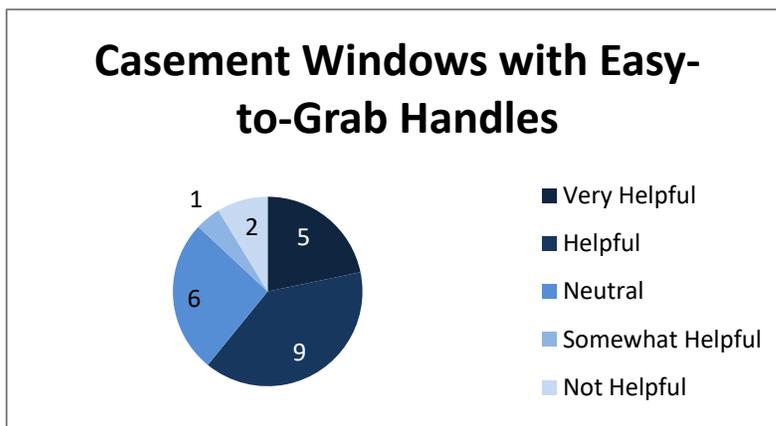


FIGURE 4.18: The ratings of helpfulness of casement windows with easy-to-grab handles (n=23).

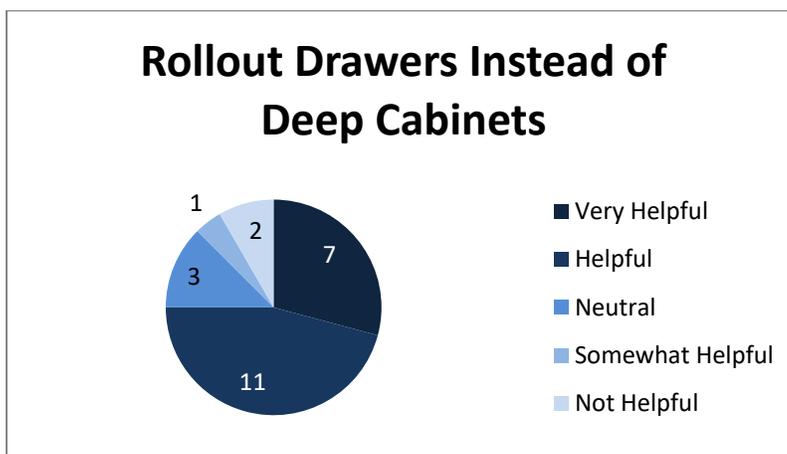


FIGURE 4.19: The ratings of helpfulness of rollout drawers instead of deep cabinets (n=24).

The results of the study indicate that the participants may be divided into three divisions: severity of arthritis, age, and years with arthritis. With five points possible for each feature and 17 features, there were 85 points possible, with the highest points indicating the highest level of helpfulness. While the severity of arthritis appeared to have an indirect relation to the average score (i.e. the more severe the arthritis, the lower the average score), both age and years with arthritis had a direct relation with the average scores (i.e. the older the participant or the longer they've had arthritis, the higher the average score). These averages are shown in Tables 4.2-4.4.

Severity of Arthritis		
	Total Respondents	Average Score
Moderate-Severe	5	58.4
Mild	8	59.375
No Arthritis	5	59.4
Not Specified	5	64.6

TABLE 4.2: The average scores out of 85 for the features based on the severity of arthritis (n=23).

Age		
	Total Respondents	Average Score
18-24	8	57.625
33+	9	63.2

TABLE 4.3: The average scores out of 85 for the features based on age (n=17).

Years with Arthritis		
	Total Respondents	Average Score
1-5 years	5	56.2
10+ years	6	69.67

TABLE 4.4: The average scores out of 85 for the features based on years with arthritis (n=11).

Question 5: Now that you have seen some suggested features for the home, which ones do you think would help you? If none, why not?

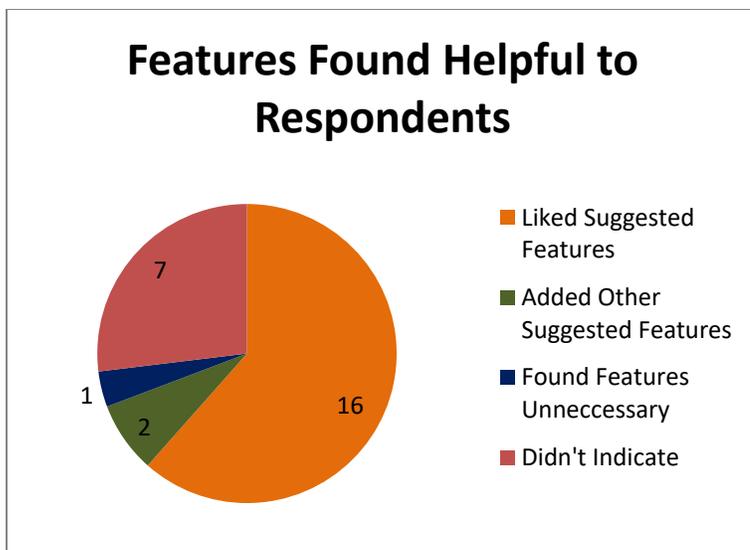


FIGURE 4.20: The open-ended responses from participants regarding features they would use in their homes (n=26).

The open-ended results (seen in Figure 4.20) can be categorized into four general responses. Sixty-two percent of respondents (n=16) liked the features suggested and indicated they would put them in their homes. Eight percent (n=2) made additional suggestions, some of which are already in their homes. Four percent (n=1) responded that these features were not necessary. This participant also indicated that he or she did not have arthritis, which is probably the reason he or she found no need for them. Twenty-seven percent (n=7) did not indicate whether they would use any of the features.

Question 6: Were you aware before this survey that there were ways of improving your home to aid you in dealing with your arthritis? Check one.

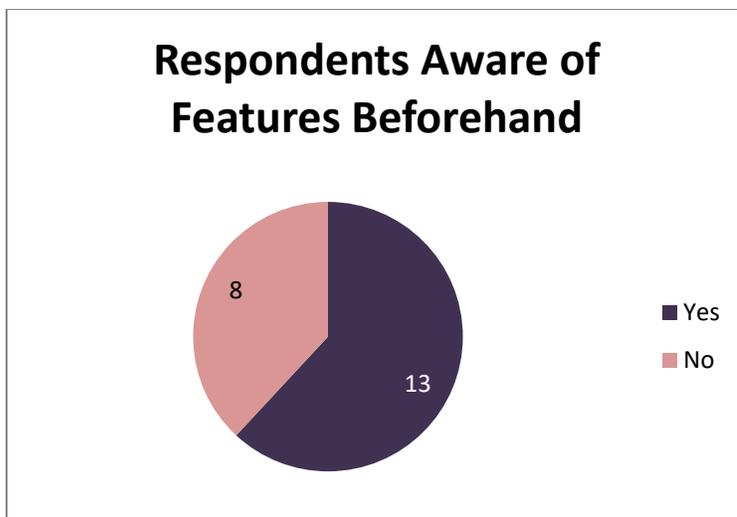


FIGURE 4.21: The responses of whether respondents were aware of such features before taking the survey (n=21).

These results (Figure 4.21) reflect that the majority of respondents, 62% (n=13), were aware of features that could help to improve their quality of life.

Question 7: How long have you had arthritis and how would you describe its severity (mild, moderate, or severe)? Example: 13 yrs, mild

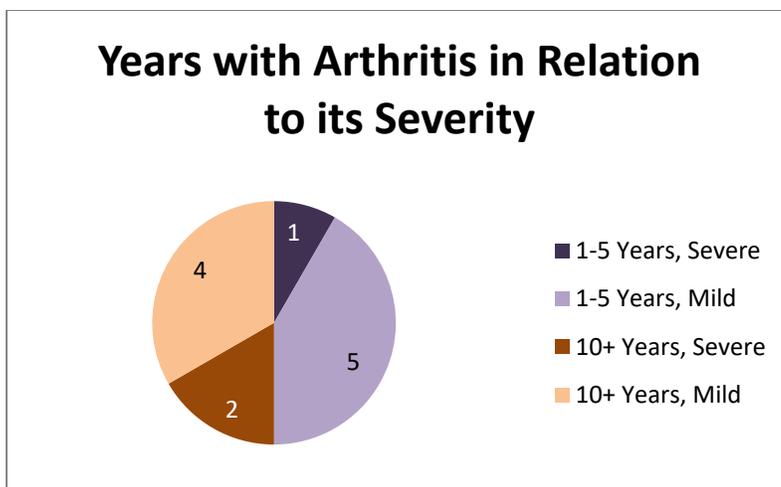


FIGURE 4.22: Years with arthritis and its severity (n=12).

The results (Figure 4.22) show that 50% (n=6) respondents had arthritis 1-5 years and the other 50% (n=6) had it for 10 years or more. No respondents indicated they had arthritis for 5-10 years. Furthermore, 25% (n=3) of the responses indicated severe arthritis while 75% (n=9) indicated mild arthritis. These responses were also cross tabulated with responses to other questions, such as how the severity and length of time with arthritis affected the ratings of the 17 features in this study.

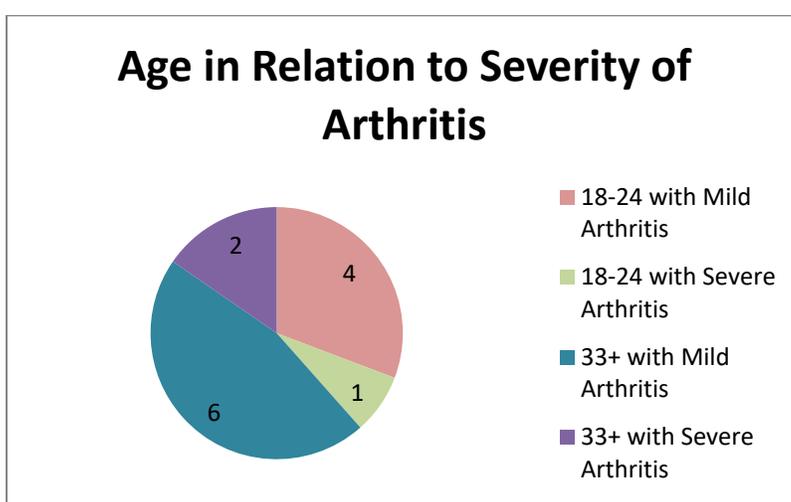


FIGURE 4.23: Age in relation to severity of arthritis (n=13).

Figure 4.23 shows additional information about the severity of arthritis in relation to age. Breaking the ages up into the two groups, we see that 31% (n=4) of respondents who gave their age and level of severity were 18-24 with mild arthritis. Eight percent (n=1) were aged 18-24 with severe arthritis. Forty-six percent (n=6) were aged 33 and up with mild arthritis and 15% (n=2) were aged 33 and up with severe arthritis. This means that 77% (n=10) of the total had mild arthritis and 23% (n=3) had severe arthritis.

Question 8: How long have you been in your current residence?

Years in Residence by Age			
	18-24	33+	Total
1 Year or Less	5	2	7
2-5 Years	3	4	7
6-10 Years	1	2	3
11 Years or More	0	2	2
Total	9	10	19

TABLE 4.5: Years in residence broken up by age (n=19).

The results (Table 4.5) display that the majority of those aged 18-24, 56% (n=5), have been in their current residence for a year or less. Thirty-three percent (n=3) of those aged 18-24 have been in their current residence for 2-5 years, 11% (n=1) of those aged 18-24 have been in their current residence for 6-10 years, and 0% (n=0) have been in their current residence for 11 years or more. For the respondents aged 33 or more, forty percent (n=4) have been in their current residence for 2-5 years. Twenty percent (n=2) of respondents aged 33 or more have been in their current residence for each of the remaining time periods: 1 year or less, 6-10 years, and 11 years or more.

Question 9: Do you live in: Check one. (House, Apartment, Residence Hall, Other)

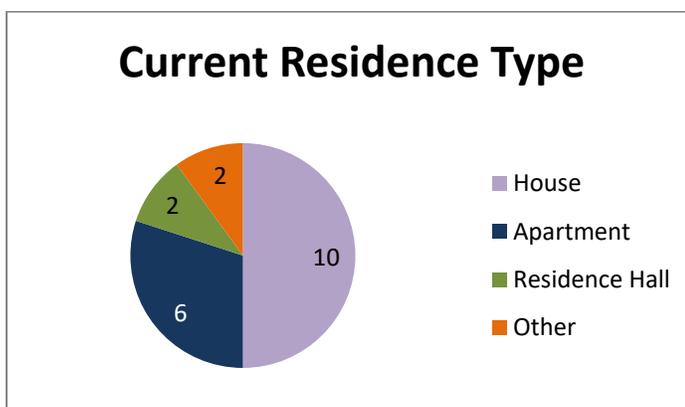


FIGURE 4.24: The dispersal of residence types among respondents (n=20).

The results (seen in Figure 4.22) showed that 50% (n=10) of respondents live in a house. Thirty percent (n=6) live in an apartment. A mere 10% (n=2) of respondents live in each a residence hall or other.

Question 10: What was your age on your last birthday and what is your sex? Example: 34, female.

Results of this question can be seen in Table 4.1. Twenty percent (n=4) were male, all of whom were aged 33 and older. Eighty percent (n=16) were female, 56% (n=9) of those were aged 18-24 and 44% (n=7) of those were aged 33 and older.

CHAPTER V

DISCUSSION

The hypotheses in this study are:

H₁: Some people with arthritis are not aware of the aids that could potentially help them.

The results of this survey support this hypothesis. It can be demonstrated by the single question of whether or not they knew about these features before taking the survey. While 62% (n=13) of respondents said they did, 38% (n=8) said they did not. These responses could be regarded as disconcerting considering their potential benefits for those with arthritis. But, they can only help if people are aware of them and are willing to use them.

H₂: People may not use them because of factors in their living situations.

The results supported this hypothesis. Six respondents said their living situation was prohibitive for reasons such as renting, living in a residence hall, or in an older home.

H₃: People may not use them because their arthritis is not severe enough yet.

The results support this hypothesis. Six respondents noted the reason for not having any features now is because they do not believe their arthritis is severe enough or they can get around fine without such features. There were even 2 responses that specifically noted that the arthritis is not severe enough yet. "I do not as yet have any limitations that require modifying my apartment" and "my arthritis is not yet that debilitating". One participant even said "Do not have it. Yet. But my mom does." These responses indicate that the participants expect the arthritis to become more severe and therefore that they may be interested in using these aids at a later date.

H₄: When the participants have seen the list of possible aids, they will indicate that these aids would be helpful.

The results support this hypothesis. An overwhelming majority of the 17 presented features were rated as either helpful or very helpful by a majority of respondents. The overall average score (of all 17 features by all respondents, which varied for each feature between 22 and 25) is 61.38/85. This score indicates an average score of 3.6/5 for each feature, which is between neutral and helpful. The two features with the lowest scores, carpet and one-handled faucets, (2.45 and 2.96 respectively) played a part in lowering the average. Twelve of the other features scored higher than the average (3.61-4.08).

It is interesting to note that, despite the mention of the level of severity as a cause to use or not use features, level of severity correlated negatively with helpfulness. Those who noted their arthritis was severe in fact rated helpfulness lower than did those who said their arthritis was mild. Furthermore, those who said they did not have arthritis rated the features even higher, and those who didn't indicate the severity of their arthritis (or even whether they have it) rated the features the highest. A reason for these surprising results could be that there were fewer people who did not indicate the level of their arthritis than there were who did, meaning the average was not reduced by any uncharacteristically low scores. Other reasons for the results could be that those with severe arthritis may see these features as still having barriers, or perhaps they have tried them before and found them not helpful. These features also may not be seen as being able to improve their condition, considering its severity. A not surprising result, however, was that age did affect how participants rated the features. The older they were the more helpful they found the suggested features. Also, years spent coping with the disease positively affected the ratings; those who had had arthritis the longest rated the suggested

features the highest. This is perhaps the strongest support of the hypothesis that aids and devices will be found helpful by those with arthritis.

The time in current residence, interestingly, appeared to have no effect on whether the participant had features because only two said that they did have them. The one who listed which features she had, furthermore, had been in her residence only 9 months. This is counter-intuitive because one would expect that the longer a participant was in the residence, the more likely it would be that they had aids. As expected, however, the younger the respondent, the shorter their time in their current residence.

The residence type was also seen to have an impact on whether respondents had any aids or features already. Several (n=6) noted that their living situation (such as the residence halls or an apartment) were reasons for not having such features.

What do the Results Mean?

The purpose of this study was to examine the awareness of potentially helpful features for those with arthritis, the rating of helpfulness for suggested features, participants' rating of the helpfulness of such features. A survey was conducted to explore opinions and awareness of aids that could be considered helpful to those with arthritis based on research in ADA, Universal Design, and aging in place as well as the student researcher's personal experience. Overall, the results of this survey indicate that those with arthritis find aids in general to be helpful, but the majority (n=30 out of 32) of them are not using them. Furthermore, fewer than half (n=8 out of 21) of them were not even aware of such aids before taking the survey. Obviously in order for

aids to be helpful to arthritis patients, there needs to be raised awareness among those who use or potentially should use them.

Reliability and Limitations

These results reflect the perspectives of college graduate and undergraduate students as well as personal contacts of the student researcher who participated in this study. The graduate and undergraduate students were majors in Nutrition and Exercise Sciences, Design and Human Environment, Human Development and Family Sciences, and Public Health. Among those departments are the majors Exercise and Sports Science, Nutrition, Athletic Training, Apparel Design, Merchandising Management, Housing Studies, Interior Design, Human Development and Family Sciences, certificate in Gerontology, Health Management and Policy, and Health Promotion and Health Behavior.

The students majoring in Housing Studies and Interior Design are familiar with the ADA, Universal Design, and aging in place and therefore would have knowledge of such guidelines and features, possibly influencing their awareness and rating of helpfulness. Those receiving a certificate in Gerontology have a level of knowledge and awareness of these features as well. Because the survey did not ask for the participants' majors, or even whether they were students or the personal contacts of the student researcher, it is impossible to know what levels of knowledge the respondents brought to the survey. It must be assumed that at least some of the participants had such a level of knowledge.

As stated previously, although the survey was designed to be taken by those with arthritis, it is clear that some of the participants did not have arthritis and some participants did not specify

whether or not they had it. It is therefore difficult to gauge the awareness and helpfulness difference between those with the disease and those without it.

Another limitation could be the high number of younger participants (aged 18-24), who most likely have not had the experience of owning their own homes yet. Because of this, their responses about having features or not, as well as their ratings of suggested features, are likely based on their parents' homes or their temporary homes while attending school and therefore do not reflect their own personal preferences about what they would do with their own homes.

The tool used for the survey, [surveymonkey.com](https://www.surveymonkey.com), created another limitation, limiting the number of questions to be asked. Therefore, the questions used were focused on gathering information about features and the use and awareness of them rather than demographics. This limited the possibilities of interpretation.

The descriptions of the features in the survey could have posed limitations as well. Because of the number of participants who were unaware of such features, it can be assumed that the descriptions might have been difficult to understand or visualize, limiting the validity of their ratings. If they did not fully understand what the features were, then they could not properly rate their helpfulness.

Furthermore, because of the ADA and other such codes, certain features in this survey, specifically lever-like door handles, have become standard in many newly built homes. If some respondents reside in such a home, then it is possible that they did not consider this feature to

be a “special feature” to aid with their arthritis. This factor could have affected the responses to the first question about whether or not they currently have special features in their home.

Interpretation

The items of this survey may have been interpreted differently by individuals based on their experience or knowledge. Even though many of the respondents did in fact have arthritis, only 2 had experience with using aids and therefore the others were rating the suggested features’ helpfulness based on assumptions. Furthermore, ratings of helpfulness could have been skewed by knowledge acquired in some major areas of study. Familiarity with the disease as well as these aids, therefore, evidently came from two different sources, experience and education.

Suggestions for Future Research

Suggestions for further research related to this study are many. The topic is important with regard to the well-being of those with disabilities such as the many forms of arthritis. The many possibilities for future research will help raise awareness of how the near environment can help improve the quality of life for those with the disease. It may also suggest specific aids and features to help these individuals.

- Further research is needed on the expense of such features in the construction of new homes as well as of adding them to already built homes.
- A survey of the likelihood of using the features based on the knowledge of such expenses is the next logical step.
- A survey of the degree of severity of arthritis related to the participants’ willingness to use aids would be useful.

- A survey of people with different types of arthritis in order to compare and contrast the different needs and preferences of each type.
- Ask for students' majors so that those with knowledge of the built environment may be compared to those without that background.
- Include different aids in the survey.
- Survey a different population, especially one that is composed only of arthritis patients.
- Conduct a survey in person with examples of the features to demonstrate what they do and how they can be helpful.
- Study how the respondents became aware of such features, if they are. Ask if they have been recommended to them by a medical person or in another way.
- Use an experimental design with these features and measure the level of reported pain related to each feature.
- Study how the different features are rated based on cost.
- Study how the use of features varies depending on the arthritis sufferers' role in the household.

Conclusions

This study explored the use, awareness, and rating of helpfulness of various features that could improve the quality of life for those with arthritis. Overall, participants found aids and features to be helpful, as the average rating of all respondents (n=23) of all 17 features was 60.74 out of 85, well over a neutral rating. It also showed that slightly less than half of respondents were aware of such features (n=8 out of 21). Furthermore, the study showed that a small minority (n=2 out of 32) actually have such features in their home. In order for these features to reach their full potential in helping those with arthritis improve the quality of their lives, there needs

to be more awareness of them. The near environment has a great influence on people's lives, so this influence can be utilized to improve the treatment of arthritis.

BIBLIOGRAPHY

- American Society of Interior Designers. <http://www.asid.org/> Retrieved May 2011.
- Arthritis Foundation. www.arthritis.org Retrieved October 2010.
- Björk, E. (2009). Many become losers when the Universal Design perspective is neglected: Exploring the true cost of ignoring Universal Design principles. *Technology & Disability*, 21(4), 117-125. doi:10.3233/TAD-2009-0286. Retrieved April 14, 2010.
- Bookman, A. (2008). Innovative models of aging in place: Transforming our communities for an aging population. *Community, Work & Family*, 11(4), 419-438. doi:10.1080/13668800802362334. Retrieved April 14, 2010.
- Davis, J. (2010, October 7). More Americans Limited by Arthritis Pain. *Arthritis Today*. From Arthritis Foundation. <http://www.arthritistoday.org/news/arthritis-americans-joint-pain-activity-limits088.php> Retrieved October 10, 2010
- D. R. La Buda (Ed.), (1985). *The gadget book: Ingenious devices for easier living*. Washington, D.C.: American Association of Retired Persons.
- Harmon, S. K., & Kennon, K. E. (2008). *The codes guidebook for interiors* (4th ed.). Hoboken, NJ: John Wiley & Sons.
- Kepley, D. H. (2005, October). The Case Against 'Aging in Place'. *Nursing Homes: Long Term Care Management*, 54 (10) 36-40.
- Peck, R. (2002). UNIVERSAL DESIGN FOR AGING IN PLACE. (Cover story) [Interview with Mary Jo Peterson]. *Nursing Homes: Long Term Care Management*, 51(6), 16.
- Pynoos, J. (2009). Lifelong housing: The anchor in aging-friendly communities. *Journal of the American Society on Aging*, 33(2), 26-32.
- Rheumatoidarthritis.com, Sponsored by Genetech. www.rheumatoidarthritis.com/healthy-living/tips-and-tools.aspx Retrieved October 15, 2010.
- Rhoads, M. A. (2010). *The ADA companion guide: Understanding the Americans with Disabilities Act Accessibility Guidelines (ADAAG) and the Architectural Barriers Act (ABA)*. Hoboken, NJ: John Wiley & Sons, Inc.
- Salmen, J. (1991). The do-able renewable home: Making your home fit your needs. *AARP's consumer affairs program coordination and development department*.
- Stone, K. (1998, Fall). Practical Beautiful, Humane. *Inside MS*, 16(3), 12. Retrieved October 21, 2010. National Multiple Sclerosis Society, 1998 and Gale Cengage Learning, 2010.

APPENDICES

APPENDIX A

Online Survey

1. Explanation of Research Study

You are being invited to participate in a research project. Carol Caughey, Associate Professor in OSU's Department of Design and Human Environment, is the Principal Investigator and Stephanie Wenning is the student researcher. The purpose of the study is to explore various features of the interiors of homes which may improve the quality of life of those with arthritis. The research is an anonymous online survey that will assign each participant a number only as an identifier. The security and confidentiality of information collected from you online cannot be guaranteed. Information collected online can be intercepted, corrupted, lost, destroyed, arrive late or incomplete, or contain viruses. Furthermore, as with any study, there is a minimal risk of Breach of Confidentiality. There are no foreseeable direct benefits to participants. Participation is completely voluntary, no questions are required and any may be skipped, and you may stop the survey without penalty. Participants must be 18 years or older.

If you have any questions about this research project, please contact: Carol Caughey at carol.caughey@oregonstate.edu or 541-737-0992

If you have questions about your rights or welfare as a participant, please contact the Oregon State University Institutional Review Board (IRB) Office, at (541) 737-8008 or by email at IRB@oregonstate.edu

If you consent to take the survey and are 18 years or older, please check yes and continue. If not, please exit the survey now.

Yes

Next

2. Does your home currently have any special devices or design features that facilitate daily activities for someone with arthritis? Check one.

- Yes
- No
- Don't Know

3. If no, why not? If it does, what devices or features does it have?

4. For each of the following features, please indicate whether you think it would be not helpful, somewhat helpful, neutral, helpful, or very helpful. Select the best answer.

	Not Helpful	Somewhat Helpful	Neutral	Helpful	Very Helpful
No steps at the entry of the home	<input type="radio"/>				
No steps in the interior of the home	<input type="radio"/>				
Compact and efficient floor plan	<input type="radio"/>				
Grab bars near the toilet	<input type="radio"/>				
Grab bars in the tub	<input type="radio"/>				
Shower seat	<input type="radio"/>				
High toilets (approx 4 inches higher than the standard)	<input type="radio"/>				
Lever-like door handles instead of spherical knobs	<input type="radio"/>				
Waist-height oven	<input type="radio"/>				
Carpet instead of hard flooring	<input type="radio"/>				
Lever-like faucet handles instead of spherical knobs	<input type="radio"/>				
One handed faucets instead of one for hot and one for cold	<input type="radio"/>				
Walk-in shower or shower stall instead of a shower/tub combo	<input type="radio"/>				
Chairs with full arms and space underneath for your feet for support when standing up	<input type="radio"/>				
Soft mats near the kitchen sink and other heavily-used areas	<input type="radio"/>				
Casement windows with easy-to-grab handles	<input type="radio"/>				
Rollout drawers instead of deep cabinets	<input type="radio"/>				

5. Now that you have seen some suggested features in a home, which ones do you think would help you? If none, why not?

6. Were you aware before this survey that there were ways of improving your home to aid you in dealing with your arthritis? Check one.

Yes

No

7. How long have you had arthritis and how would you describe its severity (mild, moderate, or severe)? Example: 13 yrs, mild

8. How long have you been in your current residence?

Years

Months

9. Do you live in: Check one

House

Apartment

Residence Hall

Other

10. How old were you at your last birthday and what is your sex? Example: 34, female

APPENDIX B

Photos of the Seventeen Features in Survey



1. No steps at the entry of the home:

<http://hpipropertiesllc.com/Field%20Crest.htm>

2. No steps in the interior of the home: Single Story Home
3. Compact and efficient floor plan: Small and easy to get around



4. Grab bars near the toilet:

<http://www.kppshome.com/Bathrooms.html>



- 5/6. Grab Bars in the tub and shower seat:

<http://handicapshowers.info/wheelchair-accessible-showers/>

7. High Toilets (approx 4 inches higher than the standard height): ADA Accessible style



8. Lever-like door handles instead of spherical knobs:

<http://www.bhomes.org/SpecImages.asp?Key=225>



9. Waist-Height Oven:

<http://uncrate.com/stuff/turbochef-oven/>



10. Carpet instead of hard flooring:

<http://stair-carpet.net/tag/hardwood-flooring>

11. Lever-like faucet handles instead of spherical knobs:



This



Not this

<http://www.everyfaucet.com/Delta-3538-DLT3811.html>

<http://shopping.yahoo.com/bathroom-faucets/mueller--brand/>

12. One-handed faucets instead of one for hot and one for cold:



This



Not this

<http://www.everyfaucet.com/Moen-8430-MOE1202.html>

<http://www.everyfaucet.com/Delta-3538-DLT3811.html>

13. Walk-in shower or shower stalls instead of shower/tub combo:



This



Not this

<http://www.handicap-showers.net/> <http://www.hoteloceaninn.com/popups/hotelroom4.html>

14. Chairs with full arms and space underneath for your feet for support when standing up:



<http://www.nemschoff.com/prodpageSG.asp?pagelD=70649>



15. Soft mats near the kitchen sink and other heavily-used areas:

<http://www.apartmenttherapy.com/boston/how-to/how-to-make-a-felt-kitchen-mat-080139>



16. Casement windows with easy-to-grab handles:

http://www.tootoo.com/buy-narrow_profile_glass_doors/



17. Rollout drawers instead of deep cabinets:

<http://www.dccabinetry.com/AccessoriesPhotos.htm>

APPENDIX C

Raw Results

Page 1

Question 1: Online Consent

Yes—43 (100% of respondents)

Page 2:

Question 2: Does your home currently have any special devices or design features that facilitate daily activities for someone with arthritis? Check one.

Skipped—4

Yes—2

No—30

Don't know—7

Question 3: If no, why not? If it does, what devices or features does it have?

Skipped—23

4/1/11 5:55am—I live in an apartment

4/1/11 6:47am—my arthritis is not yet that debilitating

4/1/11 7:37am—my father built the home, and didn't find a need to put features in it related to someone who has arthritis

4/1/11 7:58am—not implemented when Apartment built and no one in home has arthritis

4/1/11 8:11am—arthritis is mild (non-severe)

4/1/11 8:30am—don't know

4/1/11 9:52am—I don't know. I live in the dorms...I did not design the place.

4/1/11 10:16am-- I live in a duplex. The structure does not have stairs inside. It is fairly small and I can get around just fine.

4/1/11 10:27am-- Special flat door handles, ties on drawer handles, elevated couch/bed, automatic garage door, ergonomic keyboard, track mouse, cart with rollers to move heavy things, laundry baskets with wheels, smart phone to pay bills without writing, very sharp ergonomic knife, bins for clothes instead of hangers or drawers, pull on refrigerator door, and a kindle so I do not have to carry heavy books.

4/1/11 11:40am-- My arthritis is not severe enough to need them

4/1/11 11:02pm-- No one in our house has arthritis.

4/5/11 1:16am-- They are not necessary at the severity level of my arthritis

4/5/11 6:04am--It is an apartment.
 4/5/11 12:08am--no one has arthritis
 4/7/11 1:21pm-- Our home is an older home.
 4/12/11 2:32pm-- i live in dorm
 4/13/11 8:38am-- I do not as yet have any limitations that require modifying my
 apartment
 4/14/11 2:52pm--No need to

Page 3:

Question 4: For each of the following features, please indicate whether you think it would be not helpful, somewhat helpful, neutral, helpful, or very helpful. Select the best answer.

Skipped—17

No steps at entry	1	2	4	12	5
No steps inside	1	1	3	9	10
Compact floor plan	1	1	5	12	6
Toilet grab bars	1	2	8	8	4
Tub grab bars	1	4	5	4	9
Shower seat	1	1	5	13	3
High toilet	1	3	5	8	5
Lever door handles	1	2	4	6	10
Waist high oven	0	2	7	7	7
Carpet	6	4	9	2	1
Lever faucet	1	2	4	9	7
One handle faucet	7	1	4	10	2
Walk in shower	2	3	4	8	7
Full arm chairs	3	2	2	8	7
Soft mats	3	2	4	11	4
Casement window	2	1	6	9	5
Rollout drawers	2	1	3	11	7

Question 5: Now that you have seen some suggested features in a home, which ones do you think would help you? If none, why not?

Skipped—24

4/1/11 6:52am--Walk-in shower Rollout drawers
 4/1/11 7:37am--A compact and efficient floor plan, waist high oven, carpet, lever-life handles, one handled faucets and rollout drawers
 4/1/11 7:48--Steps lead to falls, whether by the elderly or children. An outdoor one is

OK-it prevents water from flowing inside-important in areas that are wet. (But difficult if you need a wheelchair. It is good to NOT have a lip where the door closes, for walkers to hang up on, or wheelchairs to get stuck on when manual. Faucets are hard with arthritis period. Shower seats can be used by all people. All shower only set-ups should have no lip so walkers can go in. Slight slope in the bathroom on the floor to allow drainage of water would be good. Carpet depends. If you urinate a lot or have pets or kids, it is dirty a lot. Maybe a non-slip material for a floor. Carpet helps with falls. One handled faucets are a pain to regulate. All my chairs have space underneath for standing. I will have arms when I need them, or use my talbe. Drawers are better than getting on your hands/knees to get into the back. Soft mats in kitchen are good for slip-proofing, but get dirty and heavy and hard to move by those with pain.

4/1/11 8:07am--Rollout drawers, waist high ovens and as little stairs as possible

4/1/11 8:14am--Lever handles on doors and faucets would be helpful.

4/1/11 8:33am--if apartment, 24/7 light where front door is

4/1/11 10:21am-- Higher toilet, Chairs, Walk-in shower, One handle faucets, Waist-height oven.

4/1/11 10:25am-- Wider entrance doorways, wall switches easy to reach. Telephones in every room.

4/1/11 10:32am-- I used to have a waist high oven, but my current home does not. Out of your list, that would be the thing that would help the most.

4/1/11 11:43am—No steps and waist high sink and oven would be the most helpful

4/1/11 11:03pm-- I don't think any of these things would help me because I have no problem living in a home where none of these exist.

4/2/11 1:14am-- lever-like door handles rollout drawers shower seat

4/4/11 6:02am-- The door knobs. It can be so difficult to turn knobs so lever like handles are way better.

4/4/11 7:31am-- no steps in or out, rollout drawers

4/5/11 2:30am-- Stairs are really difficult to handle on bad days. Sometimes I do not go anywhere because the thought of having to deal with the stairs outside my building is just too much. Shower chairs are great for the fatigue that comes with arthritis. I would love waist high ovens, washers, and dryers. Bending over hurts my back and after doing one load of laundry I often have to rest for a day or more. Lever handles are nice because you don't have to grip them, you can use an elbow or wrist or foot even if your hands are acting up.

4/5/11 6:08am--The no-stairs would be extremely appreciated; however, not an option for me at this point. I would say that a bar in the shower seems one of the most important features

4/7/11 1"21pm-- All of the above suggestions are features that would be helpful to me.

4/12/11 2:34pm-- shower seat would be nice

4/13/11 8:41am-- I would love waist high ovens and roll out drawers instead of deep

cabinets. When I have to bend down to get things out of a cabinet, it is hard to get back up

Page 4:

Question 6: Were you aware before this survey that there were ways of improving your home to aid you in dealing with your arthritis? Check one.

Skipped—22

Yes—13

No—8

Question 7: How long have you had arthritis and how would you describe its severity (mild, moderate, or severe)? Example: 13 yrs, mild

Skipped—25

4/1/11 5:57am--3 years, very mild

4/1/11 6:53am--10 years, mild

4/1/11 7:38am--I do not have arthritis

4/1/11 7:49am--Moderate, about 15 years

4/1/11 8:15am--3 yrs, mild

4/1/11 10:23am—15, mild

4/1/11 10:26am—15

4/1/11 10:35am-- 22 years, severe to moderate, mild the last half year due to new medication

4/1/11 10:50—I do not have arthritis

4/1/11 11:43am—5 years, mild

4/1/11 4:35pm-- 5 yrs, mild

4/2/11 1:15am-- childhood diagonose, mod – severe

4/4/11 6:03am-- Do not have it. Yet. But my mom does.

4/5/11 1:20am-- 1 yr, mild

4/5/11 2:30am-- 2 yrs, moderate to severe (in remission currently)

4/5/11 6:10am--mild psoriatic arthritis

4/12/11 2:36pm-- 12yrs, mild

4/13/11 8:42am-- 19 years, mild

Question 8: How long have you been in your current residence?

Skipped—23

4/1/11 5:57am—1 year, 8 months

4/1/11 6:53am—6 years, 3 months

4/1/11 7:38am—0 years, 5 months
 4/1/11 7:49am—22 years
 4/1/11 8:07am—10 years, 3 months
 4/1/11 8:15am—8 years, 10 months
 4/1/11 10:23am—3years, 6 months
 4/1/11 10:26am—4 years, 6 months
 4/1/11 10:35am—0 years, 9 months
 4/1/11 10:50am—2years, 8 months
 4/1/11 11:43am—2 years, 3 months
 4/1/11 4:35pm—0 years, 6 months
 4/2/11 1:15am—37 years
 4/4/11 6:03am—0 years, 6 months
 4/5/11 1:20am—0 years, 7 months
 4/5/11 2:31am—2 years, 10 months
 4/5/11 2:35am—5 years, 7 months
 4/5/11 6:10am—0 years, 8 months
 4/12/11 2:35pm—1 year
 4/13/11 8:42am—1 year, 5 months

Question 9: Do you live in: Check one

Skipped—23

House—10

Apartment—6

Residence Hall—2

Other—2

Question 10: How old were you at your last birthday and what is your sex? Example: 34, female

Skipped—23

4/1/11 5:57am—22, female

4/1/11 6:53am—50, male

4/1/11 7:38am—18, female

4/1/11 7:49am—54, female

4/1/11 8:07am—18, female

4/1/11 8:15am—48, male

4/1/11 10:23am—53, male

4/1/11 10:26am—70, female

4/1/11 10:35am—33, female

4/1/11 10:50am—22, female

4/1/11 11:43am—36, female

4/1/11 4:35pm—20, female
 4/2/11 1:15am—66, female
 4/4/11 6:03am-- 22, female
 4/5/11 1:20am—19, female
 4/5/11 2:31am—24, female
 4/5/11 2:35am—35, female
 4/5/11 6:10am--47, male
 4/12/11 2:36pm-- 19, female
 4/13/11 8:43am—36, female

Responses from individual participants:

4/1/11 6:53am—50, male. 6 years, 3 months in residence. 10 years, mild. Walk-in shower Rollout drawers. my arthritis is not yet that debilitating.

4/1/11 7:49am—54, female. 22 years in residence. Moderate, about 15 years. Steps lead to falls, whether by the elderly or children. An outdoor one is OK-it prevents water from flowing inside-important in areas that are wet. (But difficult if you need a wheelchair. It is good to NOT have a lip where the door closes, for walkers to hang up on, or wheelchairs to get stuck on when manual. Faucets are hard with arthritis period. Shower seats can be used by all people. All shower only set-ups should have no lip so walkers can go in. Slight slope in the bathroom on the floor to allow drainage of water would be good. Carpet depends. If you urinate a lot or have pets or kids, it is dirty a lot. Maybe a non--slip material for a floor. Carpet helps with falls. One handled faucets are a pain to regulate. All my chairs have space underneath for standing. I will have arms when I need them, or use my talbe. Drawers are better than getting on your hands/knees to get into the back. Soft mats in kitchen are good for slip-proofing, but get dirty and heavy and hard to move by those with pain.

4/1/11 8:15am—48, male. 8 years, 10 months in residence. 3 yrs, mild. Lever handles on doors and faucets would be helpful. arthritis is mild (non-severe).

4/1/11 10:23am—53, male. 3 years, 6 months in residence. 15, mild. Higher toilet, Chairs, Walk-in shower, One handle faucets, Waist-height oven. I live in a duplex. The structure does not have stairs inside. It is fairly small and I can get around just fine.

4/1/11 10:26am—70, female. 4 years, 6 months in residence. 15. Wider entrance doorways, wall switches easy to reach. Telephones in every room.

4/1/11 10:35am—33, female. 0 years, 9 months in residence. 22 years, severe to moderate, mild the last half year due to new medication. I used to have a waist high oven, but my current home does not. Out of your list, that would be the thing that would help the most. Special flat door

handles, ties on drawer handles, elevated couch/bed, automatic garage door, ergonomic keyboard, track mouse, cart with rollers to move heavy things, laundry baskets with wheels, smart phone to pay bills without writing, very sharp ergonomic knife, bins for clothes instead of hangers or drawers, pull on refrigerator door, and a kindle so I do not have to carry heavy books.

4/1/11 11:43am—36, female. 2 years, 3 months in residence. 5 years, mild. No steps and waist high sink and oven would be the most helpful. My arthritis is not severe enough to need them.

4/2/11 1:15am—66, female. 37 years in residence. childhood diagnose, mod – severe. lever-like door handles rollout drawers shower seat.

4/5/11 2:35am—35, female. 5 years, 7 months in residence.

4/5/11 6:10am--47, male. 0 years, 8 months in residence. mild psoriatic arthritis. The no-stairs would be extremely appreciated; however, not an option for me at this point. I would say that a bar in the shower seems one of the most important features. It is an apartment.

4/13/11 8:43am—36, female. 1 year, 5 months in residence. 19 years, mild. I would love waist high ovens and roll out drawers instead of deep cabinets. When I have to bend down to get things out of a cabinet, it is hard to get back up. I do not as yet have any limitations that require modifying my apartment

4/1/11 5:57am—22, female. 1 year, 8 months in residence. 3 years, very mild. I live in an apartment.

4/1/11 7:38am—18, female. 0 years, 5 months in residence. I do not have arthritis. A compact and efficient floor plan, waist high oven, carpet, lever-life handles, one handled faucets and rollout drawers. my father built the home, and didn't find a need to put features in it related to someone who has arthritis.

4/1/11 8:07am—18, female. 10 years, 3 months in residence. Rollout drawers, waist high ovens and as little stairs as possible.

4/1/11 10:50am—22, female. 2 years, 8 months. I do not have arthritis.

4/1/11 4:35pm—20, female. 0 years, 6 months in residence. 5 yrs, mild.

4/4/11 6:03am-- 22, female. 0 years, 6 months in residence. Do not have it. Yet. But my mom does. The door knobs. It can be so difficult to turn knobs so lever like handles are way better.

4/5/11 1:20am—19, female. 0 years, 7 months in residence (hall). 1 yr, mild. They are not necessary at the severity level of my arthritis.

4/5/11 2:31am—24, female. 2 years, 10 months in residence. 2 yrs, moderate to severe (in remission currently). Stairs are really difficult to handle on bad days. Sometimes I do not go anywhere because the thought of having to deal with the stairs outside my building is just too much. Shower chairs are great for the fatigue that comes with arthritis. I would love waist high ovens, washers, and dryers. Bending over hurts my back and after doing one load of laundry I often have to rest for a day or more. Lever handles are nice because you don't have to grip them, you can use an elbow or wrist or foot even if your hands are acting up.

4/12/11 2:36pm-- 19, female. 1 year in residence (hall). 12yrs, mild. shower seat would be nice. i live in dorm.