

EXPLORING OLDER ADULTS' PERCEPTIONS OF THE UTILITY AND EASE OF USE OF
PERSONAL EMERGENCY RESPONSE SYSTEMS

by

Patricia A. McLean, RN, MS, CNS, DNS

A dissertation submitted to the Graduate Faculty in Nursing in partial fulfillment of the requirements for the Degree of Doctor of Nursing Science, The City University of New York.

2016

© 2016

PATRICIA ANN MCLEAN

All rights reserved

EXPLORING OLDER ADULTS' PERCEPTIONS OF THE UTILITY AND EASE OF USE OF
PERSONAL EMERGENCY RESPONSE SYSTEMS

by

PATRICIA ANN MCLEAN, RN, MS, CNS, DNS

This manuscript has been read and accepted for the
Graduate Faculty in Nursing to satisfy the dissertation
requirement for the degree of Doctor of Nursing Science.

Steven L. Baumann

Date

Chair of Examining Committee

Donna Nickitas

Date

Executive Officer

Donna Nickitas, PhD, RN, NEA-BC, CNE, FNAP, FAAN

Jessie Daniels, PhD, BA, MA

Joshua Richardson, PhD, MS, MLIS

Elizabeth Capezuti, PhD, RN, FAAN

Kathleen Nokes, PhD, RN, FAAN

Supervisory Committee

THE CITY UNIVERSITY OF NEW YORK

ABSTRACT

EXPLORING OLDER ADULTS' PERCEPTIONS OF THE UTILITY AND EASE OF USE OF
PERSONAL EMERGENCY RESPONSE SYSTEMS

by

PATRICIA ANN MCLEAN, RN, MS, CNS, DNS

Adviser: Dr. Steven L. Baumann

Key Words: Older adults, aging in place, functional impairment, assistive home-based technology, personal emergency response system (PERS).

Aim: The aim of this study was to explore and describe perceptions of the utility and ease of use of a personal emergency response system (PERS) among older adults who are aging in place.

Research Question: “What is the meaning of a PERS use for functionally impaired older adults?”

Design: An exploratory-descriptive qualitative design was used to recruit members of a VNSNY CHOICE Managed Long Term Care (MLTC) site in Queens, NY, who met the study’s eligibility through the selection criteria. Fourteen participants gave verbal and written consent.

Method: The researcher used a nine-question in-person interview guide to conduct the face-to-face, audio-taped, semi-structured interviews to gather information on the participants’ experiences with using a PERS device. Data were collected over a two-month period.

Findings: While many participants admitted that they did not wear the PERS neck pendant or wrist device consistently, they still reported benefiting from having the button and participating in the VNSNY program. Findings were consistent with the existing literature on PERS compliance, defined as wearing and using the device. The research question was answered: Functionally impaired older adults who use a PERS device regard it as a *Reassuring presence*, and *Simple and effortless, if you need it*, and when using it, they feel *Alone, but connected*. The overarching theme is that PERS devices serve as an adjunctive resource and a helpful backup that promotes interconnectedness.

Conclusions: Despite the significant end-user benefits of increased independence and decreased institutionalization and the availability of community support services for older adults who are aging in place—such as those provided by the VNSNY CHOICE program and its home-based assistive technology, the VNSNY PERS device—most participants in this study reported that they still did not wear or use the PERS device as the visiting nurse instructed and encouraged them to do.

Suggestions for future research: The findings of this study contribute to the literature on technology use among older adults who choose to age in place, and identified an important question for future research: “What is *use* and *non-use* of PERS?”

DEDICATION

To my parents Marjorie Anita Andrews and Cecil John Rudder, I dedicate this degree in loving memory of both of you: my first mentors. Thank you for instilling in me the importance and necessity of education. Mom, your hope for me was to become a “real secretary” after my formative years at secretarial school at home in Trinidad, West Indies. But, migrating to the United States, getting married, and giving birth to my first child, Marcus, at Harlem Hospital, was the impetus for my dream of becoming a “real nurse” because of the excellent pre- and post-partum care the Labor and Delivery nurses provided to my son and me. Dad, you often asked me: “You’re going to be a doctor too?” And of course, my reply was always: “No!” Maybe you saw some potential in me from the long discussions we had about my pride and passion for nursing and caring for older adults at work and in the community.

To my family, a big “Thank you!” To my husband Lloyd, you knew when I was taking a “deep dive” and often reminded me when to “come up for air now.” To my sons, Marcus and Jamal, this academic goal is finally fulfilled. And, to my daughter Maya, your ongoing mentoring and assistance with technological issues on the computer were truly appreciated as your “baby boomer Mom” tackled the digital divide.

My time, talent and treasure were well expended with this achievement!

“We all have dreams. But in order to make dreams a reality it takes an awful lot of determination, dedication, self-discipline and effort.” Jesse Owens

ACKNOWLEDGEMENTS

First, I would like to thank God for bestowing the virtues of determination, diligence, and self-discipline throughout this journey of achieving the Doctor of Nursing Science degree. To Dr. Keville Frederickson, thank you for offering me the opportunity of applying to the Graduate Center for this degree and acceptance into the program. To Dr. Claudia Beck, for providing the Institutional Letter of Support from Visiting Nurse Service of New York (VNSNY), to approve this study, along with their IRB board members Dr. Christopher Murtaugh and Ms. Lori King. Mr. David Smith, Director of VNSNY CHOICE Queens, NY, the 14 forthcoming participants of this study and staff, sincere thanks for your ongoing cooperation, accommodation and support with conducting this study at your site.

To my Faculty Advisor and Dissertation Chair, Dr. Steven L. Baumann, I hope to share what you taught me about exploratory-descriptive research methods with other eager doctoral research students. To my co-chairs, Dr. Donna Nickitas (who exposed me to the new meaning of “deep diving”), Dr. Jessie Daniels, Dr. Joshua Richardson, Dr. Elizabeth Capezuti and Dr. Kathleen Nokes, much appreciation for choosing to stay on my committee to this arduous end. Dr. Catherine A. Georges, I am grateful for your ongoing and welcomed support throughout my nursing education at my Alma Mater, Herbert H. Lehman College and the Graduate Center.

To my Cohort 5 colleagues, Margaret Alexandre, Joy Borrero, Joan Buckley, Mary Joseph, Abigail Kotowski, Layla Qaabidh, and Alice Tobin, this remarkable experience pushed us to aspire individually and together. Of course the administrative DNS/PhD staff are also appreciated for their roles in helping me stay focused and on schedule with the minutiae of completing this degree.

“Better is possible. It does not take a genius. It takes diligence. It takes moral clarity. It takes ingenuity. And above all, it takes a willingness to try.” Atul Gawande.

Table of Contents

ABSTRACT _____	v
DEDICATION _____	vi
ACKNOWLEDGEMENTS _____	vii
Chapter I:	
AIM OF THE STUDY	
Aim of the Study _____	1
Personal Emergency Response System(PERS) _____	3
Functional Impairment _____	4
Research Question _____	6
Phenomenon of Interest _____	7
Justification _____	9
Phenomenon discussed within Specific Context _____	10
Nursing’s Integration to Technology and Health _____	11
Assumptions _____	14
Biases _____	15
Relevance to Nursing _____	15
Summary _____	17
Chapter II:	
EVOLUTION OF THE STUDY	
Historical Context _____	19
Literature Review _____	19
Home-Based Technology _____	19
The Digital Divide _____	22
The Digital Divide among Older Adults in the United States _____	23
Functional Impairment _____	25
Use of PERS _____	27
Theoretical Context _____	32
Theoretical Model: Technology Acceptance Model (TAM),(Davis, 1989)___	32
Theoretical Background of TAM,(Davis, 1989)_____	35

Theory of Reasoned Action (Fishbein & Ajzen, 1975) _____	35
Theory of Planned Behavior (Ajzen, 1985) _____	35
Theory of Self-Efficacy (Bandura, 1977) _____	35
Experiential Context _____	36
Informal pilot interviews _____	36
Summary _____	38
Chapter III:	
METHOD	
Background of Method _____	39
Method: Exploratory-Descriptive _____	40
Definition of TAM Constructs _____	40
Rationale for Selection _____	42
The Process of the Method _____	42
Recruitment _____	42
Participants _____	43
Gaining Access _____	44
Interviewing Procedures _____	44
Screening _____	45
Data Collection Procedures _____	45
Interviewing _____	44
Data Storage Procedures _____	46
Inquiry Methods _____	46
Data Management and Analysis _____	47
Protection of Human Subjects _____	47
Summary _____	47
Chapter IV:	
FINDINGS	
Participants' Demographics and Stories _____	49
Participants' Demographics _____	49
Table 2. Participants' Demographics _____	51
Participants' Stories _____	52

Objectives of The Study _____	71
Thematic Analysis of Objectives _____	80
Table 3. Themes and Examples of Key Comments _____	85
Content Analysis of Objectives _____	86
Summary _____	87
Chapter V:	
DISCUSSION OF THE FINDINGS	
Discussion of the Findings _____	89
Theoretical Analyses _____	90
Theory of Reasoned Action (Fishbein & Ajzen, 1975) _____	90
Theory of Planned Behavior (Ajzen, 1985) _____	91
Theory of Self-Efficacy (Bandura, 1977) _____	93
Technology Acceptance Model (TAM) (Davis,1989) _____	94
Implications of The Study _____	98
Relevance of The Study _____	100
Generality _____	101
Limitations _____	101
Suggestions for Future Research _____	102
Summary _____	105
APPENDICES	
A.Diagrams _____	107
Diagram A.1 TAM (1989) Model _____	107
Diagram A.2 TAM (2000) Model 2 _____	108
Diagram A.3 TAM (2008) Model 3 _____	109
B.Figure1. Philips Lifeline pendant and wrist-style PERS _____	110
C.VNSNY Institutional Letter of Support _____	111
D.Consent Form for Research Study _____	112
E.Internal Review Boards (IRBs)	
E.1VNSNY _____	114
E.2 Hunter College (HRPP) _____	116
F. VNSNY Administrative Letter of Support _____	117

G. VNSNY Conflict of Interest Disclosure Form _____	118
H. Scripts	
H.1 In-Person Recruitment Script _____	122
H.2 In-Person Screening Script _____	123
H.3 In-Person Interview Script _____	124
I. Tables	
Table 1. Interview Guide _____	125
REFERENCES _____	126

Chapter1

AIM OF THE STUDY

The primary aim of this exploratory-descriptive qualitative study is to explore and describe perceptions of the utility and ease of use of a personal emergency response system (PERS) among older adults who are aging in place.

It has been well documented that, as in other countries around the globe, the population of the United States is aging at a dramatic rate, and the number of persons over the age 85 and of those requiring assistance of various types are also increasing dramatically (World Health Organization, 2011). While there is no global criterion for defining *older adult*, many developed societies consider those who are 65 years old and older as such (United Nations, 2008).

Living to an advanced age often involves several challenges, including some level of deterioration in cognitive and physical function (Bronikowksi & Flatt, 2010). Despite declining physical and functional ability, the vast majority of older adults in the United States want to remain in their own home as long as they can (Healthy People 2020, United States Department of Health and Human Services, 2013). Aging in place is a concept that represents the older adult's ability to live at home safely, independently, and comfortably, regardless of age, income, or functional ability (Centers for Disease Control and Prevention, 2013).

The increased number of Americans living longer is attributed to improvements in health and living standards (Moody, 2006). However, a problem is that some older adults' ability to remain at home is compromised by their decline in level of functioning. An American Association of Retired Persons survey on aging in place among adults 65 and older (n = 940), found nearly 90% (n = 845) want to stay in their homes for as long as possible, and 80% (n =

750) believed that their current residence are where they will always live, despite a functional limitation (AARP, 2010).

In 1965, in response to a lack of community social services for older adults, Congress passed the Older Americans Act, which provided funding (Administration on Aging, 2013). Since 2001, the CDC Healthy Aging Research Network (2011) has used a coordinated approach to develop, test, and share the best strategies for keeping older adults healthy, by promoting healthy aging projects nationally. Healthy People 2020 is another nationally coordinated program that, among other goals, seeks to improve the health, function, and quality of life of older adults who choose to remain at home (DHHS, 2013).

Since most older adults wish to stay at home, there will be an increased demand for home-based personal assistive technology (AT) services such as a PERS (Aging in Place Technology Watch, 2012; Hessels, Le Prell, & Mann, 2011; Lifeline Systems, 1974) to support this desire. AT devices refer to any item or piece of equipment, whether acquired commercially, modified, or customized, that is used to increase, maintain, or improve functional capabilities of individuals with disabilities (Assistive Technology Industry Association, 2012). Yet, some older adults face obstacles to the effective use of these forms of AT due to physical limitations (Czaja, Lee, Nair, & Sharit, 2008).

Physical limitations may affect an older adult's functional ability, and therefore, a comprehensive multidisciplinary plan of care—including a visiting nurse trained in geriatric care, a physical therapist, a social worker, and a psychologist—may be required (VNSNY, 2013). Additionally, there may be specialty referrals and home visit services that may be available for at least a year through Medicare. Homecare nurses can encourage older adults to utilize PERS services, guiding and reassuring them about incorporating PERS units as part of their daily

healthcare routine for maintaining independence (Hessels, Le Prell, & Mann, 2011). It is essential for the homecare nurse and home health aide to foster PERS use among individuals who need help in their everyday activities because of a chronic or disabling health condition (VNSNY, 2013).

Personal Emergency Response System (PERS)

When used as intended, a PERS—also known as a medical emergency response system or a medical alert—is a type of home-based AT that promotes safety and decreases the incidence of morbidity among community-dwelling vulnerable populations, such as functionally impaired older adults (Hessels, Le Prell, & Mann, 2011). The first PERS device was designed in 1974 by Andrew S. Dibner, MD, PhD, who believed that if an elderly or disabled person fell and needed help in a home without telephone access, then he or she could benefit from AT that could summon help (Philips Lifeline Systems, 2011). He believed that, if made practical, such a technology could have life-saving effects. Since then, more than seven million people in the United States have purchased such technology (Philips Lifeline, 2013).

Typically, clients subscribe to a PERS, which provides a choice of waterproof wireless pendant or wrist-style help button. Installation of the transmitter requires a simple electrical socket. Pressing the call button alerts staff at a 24-hour call center, who access a database that contains each client's profile, which consists of a medical history, and names and phone numbers of important contacts in the event of an emergency (Philips Lifeline, 2014). In 2010, Lifeline Systems introduced the advanced Lifeline AutoAlert™ pendant. At the time, this was the only medical alert PERS that distinguishes between normal movement and an actual fall, and is able to detect up to 95% of falls, alerting the center if the subscriber is unable to speak.

It is projected that the marketplace for home-based assistive technology devices designed for older adults is expected to grow sharply from \$2 billion in 2013 to more than \$20 billion by 2020 (Aging in Place Technology Watch, 2015). Aging in Place Technology Watch is a market research firm that provides guidance about technologies and related services that may contribute to older adults' ability to age in place longer, while they try to maintain some level of independence.

PERS use may yield significant benefits for older adults, with or without a diagnosis of functional impairment (Dibner, 1981; Hessels, Le Prell, & Mann, 2011, & VNSNY, 2013). However, because PERS "use" isn't defined consistently, a methodological gap exists in the literature, suggesting that the literature over- or under-represents actual PERS use.

Functional Impairment

The definition of functional impairment has changed over time and is used in different ways by different authors. An early definition of functional impairment is a loss or abnormality of psychological, physiological, or anatomical structure or function (WHO, 1980). A more recent definition of impaired function is an alteration of an individual's health status; such as a deviation from normal in a body part or organ system and its functioning, according to the American Medical Association's 6th edition of the *Guides to the Evaluation of Permanent Impairment* (AMA, 2009). Healthcare for older adults focuses on function, which covers the cognitive-mental (thinking and remembering), psychological, physical, and social aspects of a person's life (Wells, 2006).

Functional impairment has also been related to one or more chronic diseases such as dementia, arthritis, and stroke, which affects almost three-quarters of older adults in the United States (CDC, 2013). In terms of cognitive status, functional impairment in instrumental activities

of daily living (ADLs) has been identified in older adults with mild cognitive impairment (MCI), according to a study by Perneckzy, et al. (2006). In addressing cardiovascular aspects of functional limitations, new or recurrent strokes affect approximately 780,000 older adults every year (CDC, 2013). As a result of disability-related functional impairments, one-third of inpatient rehabilitation patients experience an increase incidence of fall and fall-related injuries and some loss of ADLs, such as the ability to walk independently again (American Heart Association, 2014).

In 1997, 8.6 million older adults in the United States had difficulty with one or more ADLs and 4.1 million needed personal assistance of some kind (McNeil, 1997). In 2008, only 33.7% of older adults with reduced physical or cognitive function engaged in light, moderate, or vigorous leisure-time physical activities (National Health Interview Survey, 2012). The 2010 U.S. Census estimated that 49.7 million people, primarily older adults, had a long-lasting functional condition or disability-related impairment that affected their overall quality of life. *Quality of life* is a term that is often used as a single, general measurement of the combination of functional aspects of an individual's life (Wells, 2006). An overall improvement in the quality of life of older adults aging at home is an objective of Healthy People 2020, which focuses on improving their ability to complete basic daily activities that may decrease sedentary behavior, fear of falling, and impaired function (USDHHS, 2013).

Direct marketing and commercial advertisements suggest that the use of AT devices, such as a PERS, provides various benefits for older adults, particularly those who are homebound and living alone. The literature provides some evidence that a sense of security, independence, safety, and quality of life for the functionally impaired older adult may be enhanced with such technology (Aging In Place Technology, 2012; Dibner, 1990; Hessels, Le

Prell, & Mann, 2011; VNSNY, 2013). Overall, despite the positive physiological benefit of a prolonged level of independence and the psychosocial benefit of feeling secure at home because of the use of a PERS, an earlier study found that some older adults still do not use it (Mann, Belchior, Tomita, & Kemp, 2005). A study by Fleming and Brayne (2008) also notes that when alone at home and faced with an emergent situation, some PERS subscribers do not wear the push-button device at all times or use it (activate the device) during an emergency.

However, when at home alone and faced with an emergent health-related situation, such as a fall, some older adults who subscribe to a PERS do not use their PERS transmitter to summon professional help. The literature at this time is not clear why this is so; therefore, there remains a methodological gap suggesting an over- or under-representation of actual PERS “use.”

The primary aim of this exploratory-descriptive study was to examine community-dwelling older adults’ perceptions of the utility and ease of use of a PERS. Through an interview guide (see Table 1), in-depth, semi-structured interviews, and the rich data collection based on the Technology Acceptance Model (TAM) (Davis, 1989), the researcher gained a fuller understanding of the perceptions of the participants in relation to their use of a PERS. The findings of this study may contribute to the literature on use of technology in later life, as well as generate hypotheses for future research on home-based AT devices and its use among this population.

Research Question

The research question is: “What is the meaning of a PERS use for functionally impaired older adults?” The researcher used the TAM model to construct interview questions to investigate the use of a PERS unit and its meaning for older adults who subscribe to the VNSNY CHOICE program, which provides a PERS to all subscribers. Only current subscribers of the

VNSNY CHOICE program were selected for the research study. Fourteen participants' stories were constructed from their responses to nine open-ended interview questions and additional questions that arose from their responses, as well as some social and health information from their medical records.

Phenomenon of Interest

The phenomenon of interest in this study is use of a PERS, a home-based AT system provided by VNSNY CHOICE to older adult subscribers who are aging in place. Older adults are categorized from age 50 through to age 65 and older, based on their use of information and communication technology (ICT) and the Internet between 2000 and 2004 (AARP, 2004). Gerotechnology is a multidisciplinary blending of gerontology and engineering services, products, and environments based on a range of ATs designed for older adults (Cowan & Smith, 1999; International Society for Gerontechnology (ISG), 2013). Gerotechnology is used by VNSNY in designing services and products for older adults aging in place, such as the VNSNY CHOICE program and PERS device.

Mann, Ottenbacher, Fraas, Tomita, and Granger (1999) conducted an initial randomized controlled study on the inclusion of an AT intervention and an environmental intervention (EI) to reduce the impact of chronic illness, disability, and dependency that results from aging (Mann, Ottenbacher, Fraas, Tomita, & Granger, 1999). The sample consisted of frail older adults aging at home in Western New York (n = 104; 52 treatment, 52 control). The objective of the study was to evaluate the AT-EI intervention service to determine whether it promoted independence and reduced health care costs in the treatment group. The interventions included home evaluations and comprehensive functional assessments. Participants in the treatment group received AT and EI interventions based on the results of the evaluation, and the control group

received “usual care services.” After the 18-month intervention, both groups exhibited significant declines in functional independence and motor scores; however, the treatment group’s decline was not as severe as the control’s.

A follow-up to the previous study was conducted by Mann, Belchior, Tomita, and Kemp (2005) among older adults with disabilities (n = 606). Ninety-three subjects owned a PERS device (mean age 79.3 years), and 513 did not (mean age 73.4 years). Among the PERS users 85 (93.4%) were currently using the device sometimes, and six (6.6%) had used it in the past but were not currently using it. Among 87 subjects on whom the researchers reported data on frequency of use, 46 (52.9%) used their PERS less than once a week. Among 65 participants who gave reasons for not using the PERS, the most commonly cited reason was a lack of perceived need (n = 35; 55.6%). Sixty-four of 89 participants (71.9%) wore a necklace pendant device; 59 of 67 participants (79.1%) felt that the device was easy to use. Among 90 participants who reported the reason for PERS use, the most common (n = 36; 40.0%) was a fall incident. Among the 78 participants who reported the PERS to be helpful, 75.6% (n = 59) expressed an enhanced feeling of security with their device; and among the 84 participants who purchased a device, 40 (47.6%) reported purchasing the device themselves. Among 457 non-users of PERS, 63% (n = 288) reported they had no interest in using a PERS, and 37% (n = 169) had an interest in using the device. Most significantly, lack of perceived need for the device (n = 233, 57.0%) was the main reason that prevented the participants from using a PERS in the past (Mann, Belchior, Tomita & Kemp, 2005).

Significant limitations of the study by Mann, et al. (2005) were the unclear meaning of *use*, *wear*, and *carry* for the PERS subscribers’ experiential account of using the device, and whether the helpfulness of the device was related to wearing it at the time of the fall incident and

timely activation of the push button. There are inconsistencies with the above-mentioned studies' findings of what it means for those participants to use, wear, and carry a PERS pendant or wrist-style button.

Therefore, the purpose of this exploratory-descriptive study was to examine older adults' perceptions of the utility and ease of use of a PERS to perhaps inform future researchers how to define use and non-use in their studies. Doing so will help us better understand the overall effects of PERS use on older adults' health outcomes. As the literature on PERS shows, there is a methodological gap as to what "use" actually means, which could lead to actual PERS "use" being inaccurately described and measured.

Justification

The prevalence of functionally impaired adults living in the community is expected to increase dramatically over the next 20 years (CDC, 2011). It is also projected that these functionally impaired adults will strain services and programs, and they will also require home care from informal and formal caregivers while aging in place (Home Technology Systems, Inc., 2004). It has been projected that there is an urgent need for innovative and accessible technology-based tools that enable older adults to access timely and effective health care information (American Institute on Aging, 2014), such as assistive gerotechnologies. The marketplace for gerotechnology designed to assist older adults is expected to increase significantly, from \$2 billion today to more than \$30 billion in the next few years, according to an updated report by Aging in Place Technology Watch (2015), a partnership with VNSNY.

A major key to increasing awareness of home-based technology devices among functionally impaired older adults, such as VNSNY's AssistNow PERS, may lie in nurses' promotion of this valuable resource. Subscribers to the VNSNY PERS receive 24-hour telephone

operator assistance, with instructions on function and usage of the device. Subscribing to, and using a VNSNY PERS unit, may provide the older adult with a sense of increased personal safety, and a safer living environment, while contributing to independent aging in place (VNSNY, 2013). Still, a PERS may be purchased and remain underused or unused, even in emergent situations such a fall.

Even when a PERS can assist in keeping a functionally impaired older person feeling safe at home, this device, like any other technology, is effective only when used properly (Lifeline Systems, 2011). However, based on the literature, there remains a methodological gap as to what “use” actually means and therefore, a possibility that actual PERS “use” isn’t being accurately measured and reported. Because the meaning of PERS “use” is unclear and perhaps inconsistent from study to study (Fleming & Brayne, 2008; Mann, Belchior, Tomita & Kemp, 2005), this exploratory-descriptive study examined older adults’ perceptions of the utility and ease of use of a PERS, while aging in place and receiving long-term homecare services due to a functional impairment.

The phenomenon of the study, PERS, will be addressed within its specific context next.

Phenomenon Discussed within Specific Context

As a means of assessing for safety and independent living of older adults aging at home, Philips Lifeline developed the Independent Living Assessment tool with a team of investigators from the Health and Disability Research Institute at the Boston University School of Public Health. This tool has undergone rigorous testing to assure its soundness and trustworthiness and focuses on three areas of the older adult’s life: moving about freely, managing life skills, and performing daily tasks. Changes in any of these areas often requires

getting support for the older adult and installing a safety device, such as a PERS, for home emergencies (Philips Lifeline, 2013).

Not having a telephone or being unable to reach one often results in significant delays in access to immediate care for the individual who is alert and verbal during a medical emergency. Therefore, the basic Lifeline device can be a source of reassurance for individuals as a high-risk fall-management intervention indoors and outdoors, easily utilized by pressing a button on a wrist or neck pendant (Lifeline Systems, 1974). Thousands of hospitals and over 65,000 healthcare professionals in the United States recommend that patients may consider using a Philips Lifeline PERS after a fall, to enhance home safety (Aging in Place Technology, 2013).

Easy-to-use devices should be designed with the user's functional age in mind, also referred to as biological age, as it relates to physical and cognitive capabilities of individuals, based on the concept of *frailty* (Mitnitski, Graham, Mogilner, & Rockwood, 1999). Gradually, AT designs focused on the functional age of the user, ease of use, and size of the device, and in the past 20 years, technological devices have become smaller, more adaptable, and easier to use.

Most PERS devices and monthly service fees are an out-of-pocket expense for the subscriber. In New York State, Medicaid subscribers may apply for the Medicaid Home and Community-Based Services (HCBS) waiver program, endorsed in the Social Security Act. The program permits a State to provide the subscriber an array of home and community-based services that assist Medicaid beneficiaries to live in the community and avoid long term institutionalization (New York Long Term Home Health Care Program, 2011). Medicare and some insurance companies may not offer reimbursement for a PERS, however, the participant's plan of care has to describe how he or she is expected to use the device in order to achieve the desired outcomes of efficiency and cost effectiveness for Medicaid reimbursement.

For some Americans, use and access is limited with regards to the Internet and information technology (The Leadership Conference on Civil and Human Rights, 2013). For the disabled or homebound older adult, Internet access is an important dimension of the digital divide—those who use versus those who do not use technology (Jensen, King, Davis, & Guntzviller, 2010). However, despite a functional limitation, once the user is provided instructional interventions about the relevance of technology, its services and benefits have been shown to be significant facilitators to using the device (Morris, Goodman, & Brading, 2007). Keeping older adults healthy, and delaying or avoiding disability and dependence, may lower the long-term health costs to families and society, thereby creating more “age-friendly” communities (WHO, 2011). A key nursing intervention for promoting independence and safety for the functionally impaired aging-in-place older adult may be the use and integration of long-term home health technology, such as the VNSNY PERS unit.

Nursing’s Integration to Technology and Health

The integration of health information technology (HIT) and nursing created a new area of practice known as nursing informatics (Greaves & Cochran, 1989). It is defined as: “a combination of computer science, information science, and nursing science designed to assist in the management and processing of nursing data, information, and knowledge to support the practice of nursing and the delivery of nursing care”(Greaves & Cochran,1989,p. 227). The Institute of Medicine (IOM) report, *The Future of Nursing: Leading Change, Advancing Health*, Recommendation 7: Prepare and enable nurses to lead change and advance health, can help nurses maximize the use of HIT for personal and professional growth and stay connected and informed (The Institute of Medicine, (IOM), 2010, p.5).

The IOM report, *Health IT and Patient Safety: Building Safer Systems for Better Care*, states, “when health care professionals implement appropriate health information technology, these interventions could help improve health care providers’ performance, better communication between patients and providers, and enhance patient safety, which ultimately may lead to better care for Americans (IOM, 2011, p.2). The National Gerontological Nursing Association (2013) views nursing as the application of a body of knowledge and skills to provide nursing care that meets the unique bio-psychosocial and spiritual needs of the diverse older adult population, regardless of where they identify “home” to be.

In 1993, VNSNY established the Center for Home Care Policy & Research with such aims as solving practical problems, helping older adults manage challenging chronic conditions, and if the need arises, effectively prepare for advanced illness and end-of-life care while aging at home(VNSNY, 2012). A new resource for current nursing, medical, and social research in home health care is the VNSNY’s *Home Health Care Research Report*. VNSNY has shown that gerotechnological research conducted by nursing healthcare organizations could aim to design, implement, enhance, maximize, and improve on the use of cost-effective, quality healthcare technology designed for older adults, such as their PERS unit (VNSNY, 2013).

Experts in nursing informatics and research are needed in transforming healthcare technology and cost-effective quality care, such as the launching of the VNSNY AssistNow PERS unit in 2010. As providers of safe, effective, user-friendly, healthcare technology services, nurses will continue to be on the forefront for caring for older adults who are choosing to age in place independently, safely, and successfully, through significant evidence-based studies (VNSNY, 2012). Evidence-based studies may be indicators for healthcare quality when based

on nurses' perceptions, attitudes, knowledge, and skills for nursing practice (Koehn & Lehman, 2008).

An exploratory-descriptive method of study guided by the research question, "What is the meaning of a PERS use for functionally impaired older adults?" allowed the researcher to gain a greater understanding of the perceptions of utility and ease of use of PERS among older adults choosing to age in place independently, safely, and successfully, despite functional impairments. The basis for this research study lies in the methodological gap of the literature as to what "use" actually represents and therefore could mean that actual PERS "use" isn't being accurately represented.

Assumptions

The researcher's assumption was that the participants provided truthful information because of the researcher's reassurance of their confidentiality and anonymity during the data collection period; participants understood that they could opt out at anytime while participating in the study and would not be penalized in any way. The researcher also assumed that most participants wanted to age in place at home and were motivated to use technology they perceived as able to help them do so independently. The researcher also assumed that adequate training with the use of a PERS among these functionally impaired participants may promote an increase in their daily usage of the device. Another assumption of the researcher was that some of the participants may find the use of a PERS to be beneficial after experiencing a life-threatening event at home, such a fall, activating the device, and receiving emergent care.

Biases

The researcher's primary bias was that some participants got the unit for various reasons, such as living alone, without believing that they needed it. Another bias was that informal caregivers, such as adult children and/or home care aides, were influential in increasing the

participants' awareness of the device. Some participants did not use the device daily because of the stigma of an age-related or health-related functional impairment. And lastly, some of the participants who benefitted from the utilization of PERS services felt that they did not need to purchase the device and pay monthly fees due to their age and degree of functional limitation.

Relevance to Nursing

This study is relevant to nursing as it increases awareness of how evidence-based geriatric practices that promote aging in place help older adults deal with functional impairment and use home-based AT effectively. Interactions between patients and healthcare providers, such as nurse practitioners, have expanded beyond the in-office visit to include telehealth and a range of ICTs that support the care of the older adults who are aging in place (Greene, Tuzzio, & Cherkin, 2012). ICT includes devices such as cellular telephones, computers, and the accessible services they provide. There are significant benefits to aging in place while using home-based AT, such as the VNSNY PERS unit (VNSNY, 2013). However, to date, there are no nursing studies about the relationship between PERS use and older adults who are aging in place.

The National League for Nursing's (NLN's) vision for transformational nursing care recommends that educators address the relevance of caring for older adults in a variety of health care settings, including the home, starting at the student nurse's level (NLN, 2012). NLN's *Caring for Older Adults* encourages academic educators and other stakeholders to partner in helping to begin providing holistic, competent, individualized, and humane elder care (NLN, 2012).

The John A. Hartford Foundation, based in New York City and founded 1929, is a pioneer in championing for research and education in the areas of geriatric medicine and nursing for over three decades. The Foundation's mission is to improve the health of older adults in the

United States by pursuing opportunities to put geriatrics expertise to work in all health care settings; advancing practice change and innovation; and developing and disseminating new knowledge and evidence-based models that deliver better, more cost-effective health care. Additionally, nursing research and care models are recognized by, and promoted through, collaborative activities of the National Hartford Centers of Gerontological Nursing Excellence (The Hartford Foundation, 2013).

The VNSNY has been providing more home care services for older adults and prescribes more assistive technologies through a multidisciplinary team of healthcare professionals than any other health care organization in New York (VNSNY, 2013). Its innovative gerotechnology service provides instructional training in AssistNow, which is a pushbutton-activated neck pendant or wrist bracelet PERS unit. The AssistNow was introduced in 2011, and is a registered trademark filed in the category of Computer & Software Products & Electrical & Scientific Products (Trademarkia Incorporated, 2014).

To date, there are over 3,000 subscribers to the VNSNY CHOICE program in the New York Metropolitan area. Major benefits to subscribing to VNSNY CHOICE may include peace of mind, security, and a more secure living arrangement (VNSNY, 2013). Once the members are enrolled in the VNSNY CHOICE program, the visiting nurse acquaints caregivers such as the family and/or friends (informal caregivers) and HHAs (formal caregivers) with the VNSNY PERS unit. An informal caregiver is defined as a person providing unpaid care by assisting individuals with at least one activity of daily living or instrumental activity of daily living (National Alliance for Caregiving, in collaboration with AARP, 2009).

After an event that threatens an older adults' quality of life, such as a fall, a PERS offers a resourceful approach to homecare AT use for older adults choosing to age in place with some

degree of independence. There are significant reassurances to PERS subscriptions. For example, the visiting nurse trains designated family, friends, and HHAs on how to use the system at the subscriber's home, and in the event of an emergency, the call center contacts them. The VNSNY PERS, a home-based technology intervention, has been shown to lessen informal caregiver concerns regarding emergent care (VNSNY, 2014).

Nursing-related homecare and long-term care organizations have seen firsthand the need to help individuals age in place safely, maintain their independence, and provide individualized training with AT devices that are compatible with the members' needs while managing their disabilities and functional impairments (VNSNY, 2013). Living at home for as long as possible is a goal of some older adults, but age-related changes may affect their ability to function mentally and physically, making it challenging to remain at home safely as it affects the older adults' overall quality of life (USDHHS, 2013; Philips Lifeline, 2013). The nurse practitioner's recommendation of a home-based AT device, specifically a PERS, maybe an appropriate intervention for promoting safety while aging in place, if the functionally impaired older adult uses the device as intended.

Summary

Chapter 1 introduced the topic of older adults, aging, and aging in place in the United States. The introduction of technological interventions, such as a PERS, targeted towards the functionally impaired older adult was addressed. The aim of this exploratory-descriptive study is to examine perceptions of utility and ease of use of a PERS among functionally impaired community-dwelling older adults receiving long-term home care services. The phenomenon of interest related to the study, PERS use, was addressed. Justification for studying the phenomenon highlighted the potential impact of the increasing aging population on health care services. The

methodological gap as to what “use” actually represents was addressed. The phenomenon discussed within specific context section addressed the evolution of PERS and nursing’s usage of health technology. The author’s assumptions and biases were discussed, along with the relevance of this study to nursing. The evolution of the study in its historical and theoretical contexts, and the researcher’s experience, will be addressed in Chapter 2.

Chapter 2

EVOLUTION OF THE STUDY

Historical Context

Literature Review

The literature regarding home-based AT for older adults dates back to the 1980s. Related topics include concerns about groups with less access to technology, also known as the digital divide, as well as the literature on functional impairment. The following databases were accessed: CINAHL Plus Full Text, Cochrane Library, JSTOR, Medline with Full Text, Nursing Resource Center, Nursing and Allied Health Collection, and Pub Med. According to Onwuegbuzie, Leech, and Collins (2012),

Using multiple source types allows the reviewer to combine the information from various sources in order to understand better the phenomenon. In other words, using multiple source types allows the reviewer to *get more out of the data*, thereby (potentially) generating more meaning and, in turn, enhancing the quality of syntheses (p. 8).

Databases were accessed in emergency medicine, gerontology and geriatrics, nursing, policy, public health, rehabilitation, research, and technology to maximize the literature on the topic. Search terms included aged, aging in place, elderly, older adults, community dwellers, assistive technology, communication technology, emergency response systems, and personal emergency response systems. Abstracts were carefully reviewed to determine the relevance of the article for its addition to the review.

Home-Based Technology

Historically, during the first half of the 20th century, older adults lived with family, which provided *social contact*. Social contact has been described as a fundamental aspect of

human existence, while being socially isolated has been associated with poorer health outcomes (Steptoe, 2013). Steptoe (2013) further emphasized that a comprehensive interdisciplinary health team, including family and friends, are obligated to offer senior home services that allow greater virtual social interaction and enhance older adults' connectivity with the world.

The Communications Act of 1934 was the statutory framework for U.S. communications policy, covering telecommunications and broadcasting. Amended by President Bill Clinton as The Telecommunications Act of 1996, the Act mandates that telecommunications services and equipment be "designed, developed, and fabricated to be accessible to and usable by individuals with disabilities, if readily achievable." The Act applies to all types of telecommunications devices and services, from telephones to television programming to computers.

Throughout the 1950s, significant changes were made in the look, function, and technology of the telephone, with the introduction of keypads and automatic long-distance dialing. During the late 1960s, the Western Electric 660 telephone had punch cards that allowed for automatic rotary dialing. In 1968, American Telephone and Telegraph Company (AT&T) proposed and, subsequently, introduced the first emergency response call using the number "9-1-1" (AT&T, 2012). The telephone became a significant means for people to stay connected when distance was a barrier to communication.

In 1972, the first PERS was developed by Life Alert Systems, and has been popularized by several other manufacturers over the last three decades (Lifeline Systems, 1974). Personal computers, answering machines, and cellular telephones were introduced throughout the 1970's and 1980's. In 1995, The World Wide Web (WWW or "the Web") was introduced, thereby increasing the marketplace for Internet use, particularly for health and/or medical information searches. An online survey conducted by Pew Research Center showed that 43% of older adult

“online diagnosers” (n = 463), those who search online for medical answers, reported that the Internet was their source for specific disease or medical information (Fox & Duggan, 2013).

The evolution of the Internet, particularly its access and use, would become ongoing challenges for groups such as older adults and people with disabilities and/or functional impairments. Government agencies and private organizations have made health information accessible for older adults, particularly the homebound, through technology with access to the Internet. For example, The Assistive Technology Act (Tech Act) of 1998 was reauthorized in 2004 and is now called *The Improving Access to Assistive Technology for Individuals with Disabilities Act of 2004*. This Act supports a program that provides grants to address the AT needs of individuals, regardless of age, disability, or environment (Assistive Technology Industry Association (ATIA), 2012).

Most states have at least one agency that receives grants to deal specifically with AT issues. For example, the National Activities Program (NAP), also known as the Protection and Advocacy for Assistive Technology (PAAT) program, encourages individuals, service providers, states, and protection and advocacy entities to support and improve the Assistive Technology Act (RSA, 2013). The Center for Accessible Technology (CforAT, 2013) designs products, services, and websites with people with disabilities in mind, including older adults, and supports the use of technology to promote independent living for this population.

In 2011, the Federal Communications Commission (FCC) estimated that about 70% of 911 calls are placed from wireless phones, and that percentage is growing (FCC, 2011). An example of a wireless telephone device is a *smart watch*, which is waterproofed and integrated with the Global Positioning System (GPS) and Bluetooth technologies. Smartwatch technologies

may further enhance the user's lifestyle and the possibility of peace of mind during an emergency, as with a conventional PERS (AmbitUSA, 2013).

In 2013, Philips Lifeline introduced GoSafe, a waterproof, cellular-enabled PERS device that includes voice-to-voice communications from a pendant that can be worn even while charging. GoSafe is the first product from Lifeline that extends its emergency response services beyond the home. This new device is geared towards younger older adults who still consider themselves active but may have had a couple of falls and are looking to empower themselves to feel safer about going out (Philips Lifeline,2013).Companies that consider how people with varying abilities will use their websites, services, and products are at a competitive advantage by developing products with a *universal design* in mind—designs not only more usable by people with disabilities or functional impairments, but by everyone (CforAT, 2013).

The Digital Divide

The term *digital divide*, as used in this study, is a gap in access to and use of technology.An earlier definition of digital divide is a socioeconomic inequality in terms of access to, use of, or knowledge of ICT, particularly the Internet (U.S. Department of Commerce, National Telecommunications and Information Administration (NTIA), 1995).

To address the issues of barriers with AT that physicians and their patients with disabilities face, the American Medical Association (AMA, 1995) convened an Assistive Technology Advisory Panel of two focus groups, consisting of consumers and allied health care professionals. In 1994, the second meeting addressed the groups' concerns to the Assistive Technology Advisory Panel to aid in the development of the *Guidelines for the Use of Assistive Technology: Evaluation, Referral, and Prescription*. A significant outcome to the guideline,—“Patient Assessment,” focused on level of functioning, patient examination/ evaluation, medical

history and physical examination, functional screening/assessment, and categories and uses of AT, to name a few (AMA, 1995).

The 21st century has shown a rapid increase in global information which has resulted in the emergence of knowledge spread through the Internet and computer technology—helping to close the digital divide for access to useful, relevant knowledge (United Nations Educational Scientific and Cultural Organization, World Report, 2005, p. 47). Valuable health information resources accessed through the Internet by older adults reflects the significance of bridging the digital divide through the knowledge of technology usage.

On March 21, 2013, the Ad Council launched the website EveryoneOn.org as part of a 3-year national public service campaign to promote digital literacy and close the digital divide. The objective of the campaign is to promote the importance of digital literacy skills among targeted audiences such as bi-lingual, low income, minority adults, who are non- or limited Internet users. The aim of the EveryoneOn model is to offer free and affordable technology and training to all Americans, through a partnership of over 21,000 libraries and nonprofit organizations in the U.S.—a major benefit that allows digital “newbies” to locate their closest digital literacy training center either through their ZIP code or toll-free help line (EveryoneOn, 2013).

The Digital Divide among Older Adults in the United States

Between 2009 and 2011, the Pew Research Center’s Internet & American Life Project conducted surveys among older adults who use the Internet. In 2008, they reported that older adults with chronic conditions (n = 357) were just as likely to use the Internet to access and disperse health information as other Internet users (Madden, 2010). Overall, 80% (n = 285) of Internet users had looked online for health information, however, there are differences based on

disability. About 50% (n = 178) living with a chronic condition used the Internet, whereas 75% (n = 268) with no disability or chronic illness used it. In a more recent study (May, 2012), they reported the greatest growth in social networking among any age group in the United States was among those adults 65 years old or older (38%), while 1 in 3 use social networking sites because of the desire to stay connected to family and friends when geography gets in the way (Zickuhr, 2012). By April 2012, 48%, or almost half, of the 35% who use it for email do so every day thereby increasing their Internet usage.

Another study noted that, due to advancing age, worsening physical and functional health, high degree of functional impairment, and social isolation, Internet use among homebound older adults is likely to be even lower than that among general older adults (Choi & DiNitto, 2013). A comparison study was conducted among a sample of low-income homebound individuals aged 60 and older and their younger counterparts, homebound adults under age 60 (n = 980). Face-to-face or telephone surveys were conducted with recipients of home-delivered meals in central Texas. Seventy-eight percent (n = 764) were age 60 years and older, and 22% (n = 217) were under age 60. Seventy percent (n = 686) were female and 30% (n = 294) male, and 42% (n = 411) were non-Hispanic white, 36% black (n = 352), and 21% Hispanic (n = 205). Seventy-five percent (n = 735) of the younger group ranged in age from 50 to 59, while the oldest person in the older age group was 102 years old. Only 34% of the under-60 group (n = 73) and 17% of the 60-years-and-older group (n = 130) currently used the Internet, while 35% (n = 75) and 16% (n = 122), respectively, of the two groups' members reported discontinuing Internet use due to cost and disability. The authors concluded that very low rates of Internet use among older adults compared with the U.S. population as a whole was due to lack of exposure to computer/Internet technology, lack of financial resources to obtain computers and technology, or

medical conditions, disabilities, and associated pain that restrict use. Some recommendations to reduce the digital divide among older adults included: offering low-income persons technology subsidies/allowances that may help them join the digital age; providing exposure and frequent use to increase Internet skill and efficacy regardless of income level and disability; and providing touch screens instead of keyboards for older adults with arthritic pains in their fingers and hands.

Functional Impairment

Between 1800 and 2000, life expectancy at birth grew from a global average of approximately 30 years to 67 years, according to the National Institute on Aging (NIA) (2011). At the beginning of the 20th century, older adults and people with disabilities were part of a minority population; the average human lifespan was only 47 years; people with spinal cord injuries had only a 10% chance of survival; and most people with chronic conditions, such as disabilities and functional impairments, lived in nursing institutions while receiving formal care (The Center for Universal Design, 2008).

In order to render a medical diagnosis of functional impairment, a criterion must be fulfilled according to the World Health Organization (WHO) International Classification of Function, Disability and Health (ICF) framework for measuring health and disability at both individual and population levels (WHO, 1980). The ICF is a unifying framework consisting of five components: 1. health conditions, 2. body structures and function, 3. activities and participation in roles, 4. contextual factors and environmental factors and 5. personal factors not classified in the ICF. For the older adult, functional dependence may influence their *lifestyle*, defined by the ICF as a personal factor which may interact with the individual's health condition and influence the level and extent of the individual's functioning (WHO, 2014).

The Centers for Medicare & Medicaid Services (CMS), previously known as the Health Care Financing Administration (HCFA) is a federal agency within the United States Department of Health and Human Services. The Medicare and Medicaid programs were signed into law on July 30, 1965 to provide access to choices in health care security for older adults and people with disabilities. CMS reported in 2011, that 3.3 million Medicare or Medicaid recipients aged 65 and older received home health care services (CMS, 2013). When older adults examine their ability to search the Internet for choices in high-quality health information or resources, and make informed decisions about applying the information, their Internet training may be particularly useful to improving their quality of life, thereby contributing to narrowing the digital divide (Choi & DiNitto, 2013).

An early nursing study projected that by 2020, 9.7 million to 13.6 million older adults will have some form of moderate to severe functional dependence (Resnick & Daly, 1998). A more recent nursing research study was conducted among older Chinese adults aging in place (n = 550) to examine the association between expectations regarding aging and functional health status (Li, Lv, Li, Zhang, Li, & Jin, 2013). *Expectations regarding aging* (ERA) was defined as: “the level of expecting achievements and maintenance of physical and mental functioning with aging, indicating the expectations of “healthy aging” for self and others” (p. 329). The researchers reported that large majorities of the participants felt that having more aches and pains (88%) and lower levels of energy (82.7%) were acceptable as they aged. The study’s relevance to nursing emphasized the urgent need for providers of community healthcare, such as nurses, to improve the expectations regarding aging and functional health among older adults who are aging in place. Therefore, a key nursing intervention which may influence the lifestyle of functionally impaired older adults who are aging in place independently, safely, and securely,

may be the VNSNY PERS unit which could aid in integrating homehealth technology, and may decrease the digital divide among its user.

Use of PERS

Early studies were conducted during the late 1970s to late 1990s to determine the cost-effectiveness of using a PERS. In 1980, Sherwood and Morris conducted a study in Boston among three groups of frail older adults (n = 551) aging in place independently, with varying degrees of functional impairment and social isolation over a three-year period. The study consisted of two groups: an experimental group of those offered Lifeline, a PERS device, and a control group (not offered Lifeline) to determine the cost/benefit ratio using PERS. The reported findings show a 7.19 cost/benefit ratio, which means a significant saving of \$7.19 on each Lifeline device; reductions in delays for nursing home placement (1 day for the experimental group, and 13 days for the control group). Overall, the findings represent the significance of PERS usage on enhancing quality of life, and savings on healthcare costs for older adults who chose to age in place.

Dibner (1981) conducted and participated in the studies with the Lifeline PERS to show its benefits, including reducing nursing home placement healthcare costs. His dedication to finding solutions that support older adults' independence continued when he began selling Lifeline Systems. As a follow-up to the Sherwood and Morris study (1980), Dibner (1981) investigated if Lifeline PERS could reduce the need for institutionalization and community support services by reducing anxiety about living alone because of fear of medical or environmental emergencies, and by motivating a person to perform normal activities when alone at home. His research question asked: "What would an elderly person do if they were alone and needed help?" A sample of 139 medically vulnerable subjects (elderly, functionally-impaired,

poor, public-housing tenants) in the Boston-Cambridge area were recruited over a three-year period, between an experimental and control group. The findings reported that the experimental subjects (n = not given) exhibited reduced anxiety and increased confidence to aging in place alone, compared to the control group (n = not given), supporting Dibner's hypotheses that the use of Lifeline could decrease institutionalization and community support services for older adults who are choosing to age in place despite a functional impairment.

VNSNY conducted an initial grant-funded demonstration project between February 1, 1992 and August 31, 1993, through a telephone satisfaction survey on the relation between PERS usage and the required hours of in-home, personal care services for functionally impaired older adults. The participants were recently discharged from a hospital, cognitively able to use a PERS device at home, and required hours of in-home personal care services (n = 117). Findings reported 29% of the participants (n = 34) used their device at least 60 times: Life-threatening emergencies were activated 19 times; 10 were non-life threatening; 16 were fall related; and 15 were classified as false alarms or user was scared. After 6 months of using the PERS device, a 93% satisfaction rate (n = 96) among the users was reported. For the 19 month data collection period, 94,000 hours were saved towards in-home personal care services, and a \$1.5 million savings towards Medicaid reimbursement for hours of home health monitoring that would have been provided by home health aides.

Hyer and Ruddick (1994) conducted an initial telephone survey among Medicaid-subsidized older adults' (n = 96) about their satisfaction with usage of a PERS within a six month period. Findings report a significant overall patient satisfaction rate of 93%

(n = 89) substantiated by responses such as; “I can get help and at the same time be independent.” “With a PERS, I can ask for help any time;” “I can have privacy but still get help if needed;” and, “When I am alone, I am not afraid.”

In 1999, an initial study conducted on the inclusion of an intervention for home-based technology, supports the belief that PERS usage reduces the impact of chronic illness, disability, and dependency, resulting from ageing and chronic conditions among older adults (Mann, Ottenbacher, Fraas, Tomita, & Granger, 1999). In 2005, a follow-up study was conducted by Mann, Belchior, Tomita & Kemp among two groups of older adults with disabilities (n = 606). One group consisted of PERS subscribers (n = 93; mean age 79.3 years), and 513 who did not (mean age 73.4 years). Findings among the PERS users report 85 were currently using it at times, and 6 had used it in the past, but were not currently using it; 52.9% (n = 47) wore or carried their PERS less than once a week; 40.0% (n = 36) stated their main purpose of using a PERS was due to a fall incident; 75.6% (n = 78) expressed an enhanced feeling of security with their device, and 79.1% (n = 59) felt that the use of the device had been helpful. The non-PERS users (63%) had no interest in using a PERS because they had no need for the device. A significant critique of this study was the unclear meaning of what it meant for the PERS subscribers to use, wear, and carry the device, and whether the device was being worn at the time of activation.

An earlier descriptive phenomenological study by Porter and Ganong (2002) was conducted on frail older widows’ experience of considering whether to be connected to a PERS. A convenience sample of participants ages 81-94 (n = 11) was selected. The findings reported the majority of the women (n = 5) described their experiences as “getting by without it” because they had never fallen; never expressed interest in it; and interacted frequently with adult children who lived nearby. Three (one aged 87; other ages not stated) had fallen several times and gotten

up without difficulty, were “waiting to get it until I really need it, and would use it.” One 94 year old who had fallen several times “convinced herself that she might get it later;” and two (one 94 year old; other age not stated) reported falling several times; their children wanted them to have the device; cost of the device was a major barrier to purchasing it, and described their experience as “borrowing no more trouble than they already have.” The major theme generated from this study is “falling and not being found” because they lived alone - a significant factor in deciding whether to purchase a PERS or not.

More recent studies have been conducted on the subscription, use, and activation of PERS devices. A prospective study on falls was conducted among 110 community-dwelling older adults in Boston, most of whom used a PERS (90 women and 20 men), over a period of 1 year, or until their death, if sooner (Fleming & Brayne, 2008). Over 33% of the users had a pendant style PERS linked to either a service center or a call bell installation in their apartments, whereas, 12% had a service center and call bell installation, and 70% had some form of alarm. The findings reported 95% of the falls (209/219) occurred when alone; 99% could not get up after a fall (141/143); 80% of the time (113/141) the faller was alone and did not activate their PERS for emergent help. Despite having the alarm system, some individuals laid on the floor for more than 1 hour before activating the alarm in 38 falls, and 1 did not use the device to get help. A critique of this study is the authors’ usage of the word *use* to mean *activate* the device.

Heinbüchner, Hautzinger, Becker, and Pfeiffer (2010) conducted a survey on the satisfaction and use of PERS among older adults who are aging in place (n = 52), and utilizing a PERS in their everyday lives. The authors defined *using* the PERS as *wearing* the help button when at home alone. Findings reported about 27% (n = 14) never wear the help button, despite

the subscribers' awareness of the medical benefit of receiving timely emergency assistance, as with the incidence of a fall.

Other recent statistics on the benefit of using and activating a PERS during an emergency, report that the activation of a PERS within an hour after a fall or some other emergency in the home, offers an older adult a greater chance of continuing to live independently; and after 12 hours of being on the floor, only 10% of older adults will continue to age in place with some degree of independence (New England Emergency Response Systems, 2012). However, the literature shows that there remains a methodological gap as to what "use" actually represents and therefore could mean that actual PERS "use" isn't being accurately represented.

Lifeline has over 100,000 subscribers in the New York Metropolitan area, and 7 million subscribers nationwide, making the company the top seller of personal emergency medical alert services (Philips Lifeline, 2013). Lifeline also has a solid stronghold on foreign market. Globally, there is an increase for PERS. The highest revenue in the landline-based PERS market was generated by North America and Europe (41%), followed by the Asian-Pacific (APAC) region with 21%, which includes China, Japan, India, Australia, and the rest of Asia-Pacific, citing the demand stems from older adult adults medical emergency issues (Qi Ma, Chen, Chan, & Teh, 2015). The authors attributed this increase to the rise in number of innovations and developments as well as the shift in demographics towards aging population. The global market for PERS is also projected to increase at a Compound Annual Growth Rate (CAGR) of 5.8% and reach \$8.4 billion by 2020, which is the mean annual growth rate of an investment over a specified period of time longer than one year (IndustryARC, 2015). The stakeholders of this report include technology standards organizations, such as Philips Lifeline, the top-selling brand

of home-based assistive technology, technology providers, and technology investors for older adults in the foreign market.

Overall, studies on home-based assistive technology have offered further insight into how technology has impacted the lives of older adults (Mann, Belchior, Tomita & Kemp, 2005; Mann, Ottenbacher, Fraas, Tomita, & Granger, 1999; VNSNY, 2013). In conclusion, the introduction of home-based assistive technology devices such as PERS (Lifeline Systems, 1974), continues to be an effective intervention for older adults, particularly when used as subscribed, after events at home such as falls. However, based on the literature, there remains a methodological gap as to what “use” actually represents and therefore could mean that actual PERS “use” isn’t being accurately represented.

Therefore, based on unclear meanings as to what usage of a PERS device means, this exploratory-descriptive study explores the meanings of PERS’s multiple perspectives through a technology-based theoretical approach, specifically adapted for older adults. The theoretical model which guided this study is the Technology Acceptance Model (TAM), (Davis, 1989), and is discussed next.

Theoretical Context

The Theoretical Model

Technology Acceptance Model (TAM), (Davis, 1989)

The model used to generate the interview questions in this exploratory-descriptive study is the Technology Acceptance Model (TAM), (Davis, 1989). TAM was developed to explain the use of technology as it pertains to computer adoption and information systems, is the most widely used theoretical framework applicable in the fields of information technology. This model postulates that one’s attitude toward a certain behavior is based on salient beliefs -

behaviors that are elicited in order to be relevant to the specific behavior studied (Benbasat & Barki, 2007).

The TAM consists of external variables that influence the five constructs of perceived usefulness, perceived ease of use, attitude towards use, behavioral intention to use, and actual technology system usage. The two main constructs of TAM are perceived usefulness (PU) defined as the degree to which a person believes that using a particular system would enhance his or her job performance. The second construct, perceived ease-of-use (PEOU), is defined as the degree to which a person believes that using a particular system would be free from effort.

Studies were conducted on the TAM in the US to show its correlation between variables, individual characteristics, and their effect on technology. For example, an earlier study has shown that it is important to examine individual differences (external variables), since they are the ultimate drivers for the use of technology (Legris *et al.*, 2003). Other studies on TAM found a significant relationship between individual differences and technology (Venkatesh, 2000; Burton-Jones & Hubona, 2005; Burton-Jones & Hubona, 2006).

From a global perspective, TAM has also been used in gerontological studies. For example, a study was conducted using an extended version of the TAM by adding age-related health and ability characteristics of older Hong Kong Chinese adults (Chen & Chan, 2014). The purpose of this study was to develop a senior technology acceptance model (STAM) aimed at understanding the acceptance of gerontechnology by older adults, and test it. STAM was empirically tested using a cross-sectional questionnaire survey with a sample of 1012 older adults aged 55 and over in Hong Kong. Individual attributes included age, gender, education, gerontechnology self-efficacy and anxiety, and health and ability characteristics. The findings showed that STAM was strongly supported and could explain 68% of the variance in the use of

gerontechnology. The authors concluded that for older Hong Kong Chinese adults, age-related health and ability characteristics were better predictors of gerontechnology usage behavior than the traditional TAM attitudinal factors of usefulness and ease of use of technology.

The TAM was revised to include the TAM2 (Venkatesh & Davis 2000, & Venkatesh, 2000). TAM2 focuses on the subjective norm (social influences) and its correlated variables image, job relevance, output quality, and result demonstrability (cognitive instrumental processes) in the workplace. For example, TAM 2 has been used by the authors in longitudinal studies from four institutions, from which the findings show that social influences, cognitive instrumental processes, and perceived ease of use significantly affected technology user acceptance (Venkatesh & Davis, 2000). TAM2 has been widely used in online business service networks (Moeser, Moryson & Schwenk, 2013). The Unified Theory of Acceptance and Use of Technology (UTAUT) was the next major development of this information systems model (Venkatesh *et al.*, 2003). The aim of the UTAUT model is to explain the intentions of the user to use an information system and the usage behavior. The UTAUT comprises of four key constructs: (1) performance expectancy, (2) effort expectancy, (3) social influence, and (4) facilitating conditions.

Venkatesh & Bala (2008) developed a third version of the TAM, TAM3, to account for ways that external effects can mediate perceived usefulness and perceived ease-of-use. TAM 3's external effects focuses on suggestive norms of perceived usefulness as determined by: 1) one's image (including how technology impacts one's status within a social network); 2) specifically the degree to which a technology is applicable to one's job; and 3) output quality, a technology's impact on one's ability to perform a job. TAM3 has been used to investigate risk perceptions in Internet banking (Li, 2013).

Theoretical Background of TAM

Theory of Reasoned Action (Fishbein & Ajzen, 1975)

TAM's origins is based on the Theory of Reasoned Action (TRA), which hypothesizes behavior is influenced by two beliefs: (1) Behavioral beliefs are defined as a person's perception that performing a certain behavior will produce a particular outcome; and (2) Normative beliefs is defined as a person's perception that a particular referent (a researcher) wants that person to perform a certain behavior (Fishbein & Ajzen, 1975).

Theory of Planned Behavior (Ajzen, 1985)

The Theory of Planned Behavior (TPB), the successor to TRA, is a related framework for understanding, predicting, and changing human social behavior. Ajzen (1985, 1991b, 2005) postulated that intention is an immediate antecedent of behavior. According to the theory, intentions to perform a given behavior are influenced by three factors: a favorable or unfavorable evaluation of the behavior (attitude toward the behavior), perceived social pressure to perform or not perform the behavior (subjective norm), and self-efficacy in relation to the behavior (perceived behavioral control).

Theory of Self-Efficacy (Bandura, 1977)

The TAM also has its origins in the social behavior theory of Self Efficacy (Bandura, 1977). Self-efficacy is defined as a judgment of one's ability to execute a particular behavior pattern (Bandura, 1977, p. 193). Bandura analyzes self-efficacy in terms of the individual's perceived ability to perform each step in the sequence or under a variety of circumstances, suggests that an individual's behavior, environment, and cognitive factors are all highly inter-related to outcome expectations and self-efficacy.

Experiential Context

Informal Pilot Interviews

The researcher conducted three informal pilot interviews among participants who volunteered to be interviewed about their personal emergency response system use, regardless of which brand they subscribed to, and length of time they had their device. Pilot testing of interviews allows the researcher the opportunities to consider the wording of questions, time frame for interviewing, and test the reliability and validity of the intended instrument (Wald, Strickland, & Lenz, 2010, p. 295).

Pilot Participant #1: This participant was selected by the daughter of one of my colleagues who knew that I was very passionate about the focus of my research study, the use of PERS among functionally impaired older adults choosing to age in place. Mrs. M., 85 years old, has a history of hip and ankle fractures due to falls at home, and, upon completion of rehabilitative services in the hospital for her fractures, Mrs. M. returned to her home without homecare services due to her level of cognitive ability and demonstrable level of independence in performing her activities of daily living (ADLs). However, due to Mrs. M.'s newly diagnosed high risk for falls and fall-related temporary functional limitations of hip and ankle fractures, she moved into her daughter K.'s home. K. subscribed to a PERS response service in addition to Skype, a free Internet service, which allows for instant voice and video connections between them. The daughters agreed that these interventions were added measures of security and safety while their mother aged in place. They were means of communicating together.

Since Mrs. M. was over 65 years, aging in place, has a history of functional limitations, subscribed to a PERS, and is techno-savvy, she did fit most of the eligibility criteria for the informal pilot interview. We mutually agreed to proceed with a scheduled time for a Skype interview. The grand tour question for the interview was: "When did you decide you needed the

use of a PERS system?” Mrs. M.’s reply was: “My daughters did. I didn’t do it. They did...I didn’t know about such a thing.” My assumption is that the significance of this answer relates to one of my biases to the study, which is: Informal caregivers, such as adult children, and/or home care aides may influence an older adult’s awareness of the device.

Pilot Participant #2: Mr. C.R., an 84 year-old with a history of arthritis, aging in place, and subscribed to a pendant-style Philips Lifeline Life Alert device after his longtime friend tripped at home, fell, and fractured his right leg. Mr. C.R. showed me his push button pendant worn around his neck at the time of the interview. Based on the determinant of *use*, I asked Mr.C.R. two questions:(1).“How often do you use your personal emergency response system?” He replied, “I showed you a few minutes ago. I am using mine now. I don’t really forget to wear it. I even bathe with it on.(2). “What does it mean for you to use a personal emergency response system?”elicited the response: “You mean wearing it or activating it?” Mr. C.R. appeared to be seeking clarification from me as to which meaning I might prefer for his *use* of the device. My assumption is that there may be an unclear meaning by the participant of his perception to *use*, *wear*, and *activate* his PERS.

Pilot Participant #3: Mr. J.W. an 86 year-old subscriber to VNSNY’s PERS neck pendant, ages in place alone, and has a history of arthritis in both hands. When he was asked, “How often do you use your personal emergency response system?”He replied he only used it twice - once for his wife and one for himself, when they fell at home. When asked, “What does it mean for you to use a personal emergency response system?” He replied: “It means wearing it so you could activate it when you are in an emergency. If you are not wearing it and you fall, like my wife did, you could call for help but nobody may hear you. It’s useless to buy the thing and

then don't use it." My assumption: This participant found the use, wear, and activation of the PERS device to be beneficial during a life-threatening event at home.

In conclusion, based on the significant responses generated from the three pilot interviews among older adults who are aging in place, it was clear that the questions were effective to address the research question, "What is the meaning of a PERS use for functionally impaired older adults?"

Summary

Chapter 2 addressed the historical context of technology from the first half of the 20th century to the new millennium. The term digital divide was defined, and its impact among older adults was emphasized. Theoretical context addressed the relevance of the Technology Acceptance Model (TAM), (Davis,1989) for guiding this study's sample, the older adult. The researcher gained experience with conducting home-based informal pilot interviews among older adults with history of falls, and highlighted their use of home-based assistive technology, specifically PERS. Chapter three will address the methods used in this study.

Chapter 3

METHOD

Background

Older adults are the fastest growing population in the US (CDC, 2011) and are increasing their capacity in using health care services (CDC, 2010). Data estimates project that by 2020, healthcare providers and patients over 65 years of age may choose to participate in a process of *calibrated care* (Aging in Place Technology Watch, 2012). Calibrated care is a process which allows healthcare providers to deliver the right level of care at the right time and right place, such as low cost home-based assistive technology devices, including a PERS (Aging in Place Technology Watch, 2012).

Healthcare services supervised or delivered away from the clients' homes or a healthcare facility, is referred to as telehealth (McGonigle & Mastrian, 2009). Home telehealth allows the professional caregiver, such as the nurse practitioner, to coordinate services for the client, caregiver, and home health aide without physical contact. The demand for home telehealth services is projected to increase significantly to a global market value of about \$8 billion dollars yearly by 2012 (McGonigle & Mastrian, 2009, p. 265).

VNSNY home-healthcare professionals, such as a visiting nurse, use home telehealth to improve communication with their client, which impacts patient outcomes by showing how well they can help the client or their loved ones through recovery or ongoing homecare (VNSNY, 2013). As part of the subscriber benefit to aging in place, VNSNY offers their CHOICE program and a free subscription to their PERS, a home-based assistive technology device.

Method: Exploratory-Descriptive

The researcher used an exploratory-descriptive method for this study. This method's qualitative approach is appropriate for this study because it allowed the researcher to explore the five objectives based on the TAM: Usefulness, Ease of Use, Intention to Use, Use, and Barriers to Use. To better understand how functionally impaired older adults' perceptions are related to PERS use, a form of home-based assistive technology, the TAM guided the framework for this study (see Appendix A.1). Based on the TAM2 and TAM3 models, these 14 participants are not employed and most do not have a home computer. Also, the participants' status in social network, image, job relevance, and job performance will not be applicable to this research study. Therefore, for this study, the original TAM was seen as the best fit for this sample and site.

Definition of TAM Constructs

Perceived usefulness (U) - The degree to which an individual believes that using the system will help him or her to attain gains in job performance.

Perceived ease of use (E) - The degree to which a person believes that using a particular system would be free from effort.

Attitude towards using (A) - Individual's positive or negative feeling about performing the target behavior (e.g., using a system).

Behavioral intention (B) - The degree to which a person has formulated conscious plans to perform or not perform some specified future behavior (Davis, Bagozzi & Warshaw, 1989, pp. 982-1003).

Additionally, the TAM was selected for this exploratory-descriptive research study based on its high reliability values. Davis (1989) conducted an initial study that measured non-health related technology in the workplace using the TAM. The results showed significant correlations between

both constructs of perceived use (PU) and perceived ease of use (PEOU) with self-reported use of these systems: PU ($r = .63, p < .001$) and PEOU ($r = .45, p < .001$). In a second study, Davis, Bagozzi, & Warshaw (1989) rated the constructs of PU and PEOU with graphic systems. The results also showed significant Chronbach alpha predictive reliabilities: PU ($= .98$) and PEOU ($= .94$), and positive significant correlations with self-predicted use for PU ($r = .85, p < .001$) and PEOU ($r = .59, p < .001$).

For the purpose of this exploratory-descriptive study, *use* of a PERS referred to the subscription of the VNSNY PERS unit, available to VNSNY CHOICE Managed Long Term Care (MLTC) members, who are functionally impaired and require homecare service for at least six months (VNSNY, 2013). VNSNY provides 24-hour telephone assistance to the subscriber on instructions and questions about the PERS unit. Only current subscribers of PERS were selected. None of the participants had previous subscriptions to a PERS. Fourteen participants' stories were constructed from their responses to the nine open-ended interview questions with some social and health information from their medical record. Once an older adult subscribes to a PERS, wears it, and uses it as instructed, they may be empowered to make proactive and timely decisions regarding their emergent care, while continuing to age in place safer, and longer (Hessels, Le Prell, & Mann, 2011). The data collected from these studies provided details of the phenomena of PERS, as explored and described from the participants' perspectives.

Exploratory-descriptive methods allow the researcher to use a representative sample of the population studied and attempted to see the viewpoint of the participants' world (Brink & Wood, 1998, pp. 284-285). Therefore, this method allowed for a rich description of the participants' self-reports of their meanings of their experiences with using a PERS.

Rationale for Selection

The rationale for selecting this exploratory-descriptive qualitative approach is the need to better understand the experiences of older adults who receive home-based assistive technology services, such as the VNSNY CHOICE PERS, and the meaning of how they use it from their perspectives. Another rationale for conducting this study is the methodological gap of the literature as to what “use” actually represents and therefore could mean that actual PERS “use” isn’t being accurately represented.

How older adults perceive technology and their abilities and health is important for nurses, members of the healthcare team and patient’s families. How older adults construct meaning is also seen as critical to their decision-making and quality of life. The researcher conducted semi-structured interviews to attempt to explore what usefulness, ease of use, and use of a PERS means for functionally impaired older adults. By doing so, the research question aimed at uncovering what is the meaning of PERS use for these 14 older adult participants.

The Processes of the Method

The process of this exploratory-descriptive research study aided the researcher in exploring the 14 participants’ perceptions of their experiences with using PERS by asking them to reflect on what it means to them. Their interpretations offered insight into the study’s overarching question: “What is the meaning of a PERS use for a functionally impaired older adult?” The meaning of an individual’s perceptions is the key to an interpretive approach which is when a researcher becomes immersed in the qualitative data to explore the meanings of the participants views (Munhall, 2007). The process of this exploratory-descriptive study began with the rationale for selecting the participants and ended with the step of protecting human subjects involved.

Recruitment

The participants in this study were recruited from a VNSNY CHOICE Adult Day Center in Queens, New York, NY. The VNSNY CHOICE Adult Day Center has approximately 160 members enrolled, 30 of whom subscribe to a VNSNY PERS unit. In-person recruitment assistance was provided by the Director of the VNSNY CHOICE program, using the IRB approved In-Person Recruitment Script (see Appendix H.1). The Director of the VNSNY CHOICE Adult Day Center recruited eligible participants who were aging in place and currently subscribe to the VNSNY CHOICE PERS. Eligible participants were approached while they were visiting the center. All Home Health Aides (HHAs) and staff were informed about the study. For the purpose of this research study, only in-person recruitment was used. At the end of the recruitment period, 21 of the 30 participants agreed to the face-to-face, digitally audio-taped interviews as scheduled.

Participants

All of the 21 participants met the inclusion criteria for the study and were VNSNY CHOICE program members. They were 65 years old or older, spoke English and gave informed consent to be interviewed and audio-recorded. All had Medicaid or were Medicaid-eligible, and nursing home eligible. Each has a home and chooses to remain in their private residence. Each also receives some daily assistance with activities of daily living (ADLs) and lives in Brooklyn or Queens. Each have a VNSNY provided PERS unit which was introduced to them by the visiting nurse. Participants documented as cognitively impaired were not included in this study. All of the participants had in their home, either a VNSNY PERS neck pendant unit or wrist device.

Gaining Access

An Institutional Letter of Support was provided by the Visiting Nurse Service of New York (VNSNY) which included approval of this study (see Appendix C). The Director of the VNSNY CHOICE program recruited and referred the eligible members who fit the inclusion criteria and were willing to be approached regarding possible participation. The screening and interviewing processes were also conducted in-person as described below.

Interviewing Procedures

Screening

An IRB approved in-person screening script (see Appendix H.2) was fielded for all eligible participants in a private setting. In this process, the researcher also discussed the Consent Form for Research Study (see Appendix D) and objectives of the study. Time was allotted for potential participants to ask any and all questions they had about what participation in the study entailed.

A print copy of the IRB approved consent form was given to all potential participants who gave verbal and written consents. Additionally, they were encouraged to read the consent form at their leisure and discuss any questions related to the research study with the Director of the VNSNY CHOICE Adult Day Center and the researcher at any time. Most importantly, they were reminded of their voluntary participation, choice to opt out without penalty or prejudice, and keeping the monetary incentive of a \$10.00 gift card for a neighborhood business. Ongoing reminders of the conditions of the consent form were efforts to maintain the integrity and rigor of the study through transparency. Noteworthy, at the end of the screening phase, only 14 of the 21 participants agreed to participate in the study at free-will. According to the Director of the center, some reasons related to the other seven non-participants included inclement weather related to extreme cold and snow, family visiting during the end-of-year holy days, and sickness.

Data Collection Procedures

Interviewing

Every effort was made to ensure that all audio-taped interviews occurred at a scheduled time convenient for the participants. Most participants used a rolling walker or cane and were escorted to the private interview room by HHAs who left the room and returned for the participant after the interview was completed. Participants who were independent in ambulation and didn't need the escort of staff, came to the interview room alone. Before the interview script (see Appendix H.3) was read to the participant, each were thanked for agreeing to participate. They were told to expect the interviews to take 30-60 minutes and that additional meetings might be arranged if they wanted to review and edit their transcripts. Participants were informed that there were nine questions about their use of the PERS, and additional questions might be asked for clarification or if they raise interesting topics that needed to be explored. Additionally, they were offered the opportunity to ask any questions they had at the end of the interview. Options were given to the participants to refer to their PERS unit by any name they were familiar with, such as "Med Alert," and may skip any questions that they don't want to answer. Lastly, the participants were asked if they had any questions related to the research study before the interview began.

The Interview Questions guided the interviews (see Appendix I. Table1). The open-ended questions were structured by the core concepts of the TAM and designed to gather specific information related to the utility and ease of PERS use. The interviews were designed to range from approximately 30-60 minutes which allowed the participants ample time to verbalize their experiences until they had no more information to share, and not feel pressured to leave for reasons such as socializing in scheduled group activities. As an ethical responsibility, the

researcher reminded all participants of their free will to participate and opt out of the study at anytime. The interviews were audio-taped to assure accurate transcription. Participants who veered away from the questions were gently reminded by the researcher about the question.

Inquiry Method

An exploratory-descriptive method of inquiry was used to explore the participants' perceptions of the utility and ease of use of PERS units. The interviews were conducted and completed between December, 2014 and February, 2015. The participants were reminded that the study's findings would be shared with them if they were interested, and they were assured that any publication would not be linked to their real names or identifiers. The researcher met with each of the 30 VNSNY CHOICE members who met the inclusion criteria to describe the study. However, only 14 members were forthcoming and gave their informed verbal and written consent. All of the interviews were face-to-face, and digitally, as well as audio-tape recorded. The researcher ended the interviews when all the question responses became redundant, and at that point, the researcher and dissertation sponsor deemed that saturation was reached.

Data Storage Procedures

All of the signed consents, digital audio recordings, verbatim transcripts, and electronic data storage devices were kept in a locked cabinet. The researcher used a personal computer, wherein all contents were password protected. The digital audio recording and verbatim hard copies were accessed by the Faculty Advisor and researcher. As per IRB requirements, all data were kept locked and confidential, and will be secured and stored for three years. All tapes and consent forms have been kept private in a locked file cabinet by the researcher, after being reviewed by the Faculty Advisor, Dr. Steven Baumann, Ph.D.

Data Management and Analysis

The researcher transcribed all of the audio tapes verbatim, editing the content to only reduce repetition during the analysis phase. All transcriptions were then checked against the audio recordings for accuracy of transcription. The audiotapes, digital recordings, and consents described above were kept in a locked cabinet. All of the comments of each participant were organized into stories of each participant's use of the PERS unit. The constructs of the TAM model were used to generate the nine questions asked of all the participants. The responses to these questions were collapsed to address the five objectives of this study, which reflect the five constructs of the TAM model: 1.) Usefulness; 2.) Ease of Use; 3.) Intention to Use; 4.) Use; and 5.) Barriers to Use. Color coding was used to uncover themes from the narrative created from all of the participant's comments. Participants were offered the opportunity to meet the researcher after the interview was completed to discuss their audio-taped interview transcripts, but none did. Member checks may involve sharing all of the findings with the participants, and allowing them to critically analyze the findings and comment on them (Creswell, 2007).

Protection of Human Subjects

The Institutional Review Board (IRB) at VNSNY (see Appendix E.1) and for the Protection of Human Research Participants at Hunter College, City University of New York, NY, approved this study (see Appendix E.2).

Summary

This is an exploratory-descriptive study whose objectives are based on the TAM that uses technology to understand the responses of the participants. The method's description addressed the setting, sample, gaining access, interviewing techniques and the interview guide. The data collection procedures addressed data collection instruments such as semi-structured interviews and open-ended questions. Data storage procedures were addressed. Rigor was discussed in

terms of its importance throughout the study. Protection of human subjects focused on the study's site and its collaborators. Informed consent was defined and explained. Limitations to the study focused on the sample and the specific type of PERS used. The researcher's anticipated timetable was scheduled within one year. Feasibility of the study and its overall relevance to nursing were highlighted. Chapter four will discuss the Results section of the study.

Chapter 4

FINDINGS

Participants' Demographics and Stories

Participants' Demographics

The participants' demographics include age, gender, marital status, race, ethnicity, living conditions, PERS subscription, and functional impairment. These personal data were compiled and submitted by the Director of the VNSNY CHOICE site for the sole purpose of this research study's data collection. Additionally, to maintain the participants' anonymity at all times, the researcher coded this information and shared it with the Director. According to the Director of the VNSNY CHOICE site, "Education" was the only personal information not accessible from the VNSNY Adult Day Center database, so therefore, it was not inclusive for data collection. The researcher validated some of the personal information through observations and the participants' audio-taped interviews

Fourteen participants were included in this study. Ages ranged from ages 68 to 91 (mean age was 79.5), including one male and 13 female. In terms of marital status, six were widowed (42.8%); five separated (35.7%); two divorced (14.3%); one never married (7.1%). In terms of race, all (n = 14;100%) identified as Black, and none identified as White. Ethnically, the majority (n = 8; 57.1%) identified as West Indian/Caribbean, 35.7% (n = 5) identified as American, one (7.14%) as African, and none as European, Asian, or Hispanic. In terms of living conditions, most (n = 11;78.5%) reported having a home health aide for at least part of the day; two lived alone; and one lived with family. For years of PERS subscription, the majority (n = 11;78.5%) had it for two to five years, and three (21.4%) had it for six or more years (21.4%). Thirteen participants reported they had a neck pendant (92.8%), and one (7.14%) had a wrist band. Half (n = 7; 50%) had multiple functional impairments and the other seven (50%)

had more than four, which was a criteria for VNSNY CHOICE membership (see Table 2. Participants' Demographics).

Table 2. Participants' Demographics

Variable		n = 14	%
Age (years)	60-69	0	0
	70-79	7	50.00
	80-89	4	28.57
	90+	3	21.42
Gender	Male	1	7.14
	Female	13	92.86
Marital Status	Married (living together)	0	0
	Separated	5	35.71
	Divorced	3	21.42
	Widowed	6	42.86
*Education			
Race	White (Not Hispanic)	0	0
	Black (Not Hispanic)	14	100.00
Ethnicity	American	5	35.71
	European	0	0
	African	1	7.14
	Asian	0	0
	West Indian/Caribbean	8	57.14
	Hispanic	0	0
Living conditions	Alone	2	14.28
	With Others:		
	Relatives	1	7.14
HHA	11	78.58	
PERS	Years of subscription		
	2 – 5	11	78.58
	> 6	3	21.42
	Type:		
	Pendant	13	92.86
Wrist band	1	7.14	
Functional impairment	1 – 3	7	50.00
	> 4	7	50.00

*Note.** = Participant education level was not available to include as a variable/characteristic.

The findings of this exploratory-descriptive study are described below: 1.) Participants stories; 2.) Responses to the objectives of the study - Usefulness, Ease of Use, Intention to Use, Use, and Barriers to Use; and 3.), Thematic reflection, comprising a content analysis.

Participants' Stories

#1 Sheila's story

Sheila is a 76-year-old Black American female who has been separated from her husband for several years, she now lives alone. According to her VNS medical records she has a history of falls, stroke, and pelvic osteoarthritis and uses a rolling walker. Also her medical records state she had a PERS unit for one and a half years and she also visits the Adult Day Center three times a week. She stated that she is not lonely because her daughter and son-in-law live in the same borough and visit her regularly. Sheila said she has fallen twice - once at her daughter who lives nearby, and once in the street with the same daughter. After falling in the presence of her daughter, Sheila said both times her daughter took her to the hospital for evaluation immediately, but the second time she was hospitalized for two days even though she “only had some soreness.” Sheila was not diagnosed with any bone fractures or breaks, and recalls with delight her visit with a nurse during her hospitalization to introduce and discuss a PERS unit for her home.

Sheila said her daughter was excited to speak to the visiting nurse about getting a free system for her. Upon discharge from the hospital, Sheila received her free “Medical Alert” neck pendant which she has for a year and a half now, and she describes her Medical Alert as good so far because if she has an accident or fall, she can press the button and they’ll come and see her. Sheila states her PERS is very simple to use and she wears it around her neck like a pendant, yet during the interview she admitted to not wearing it because the visiting nurse said it was only to

wear at home. Sheila admitted that she was not wearing the PERS pendant because the nurse told her it can only be worn at home. Sheila admits that she does not wear the PERS neck pendant when someone is at home with her, and her daughter and son-in-law are there most of the time. What she does is puts it on when they are not there, that is to say when she's alone. She doesn't use it in the shower. Sheila says she expects to continue using her PERS unit until she gets better with God's will, and he'll help her get better, and she is going to continue wearing it. She thinks that the PERS seems to be safer and seems to be more convenient for her, and has never pressed the alarm because she has not had any more falls.

Sheila admitted that she accidentally pressed it while showing it to her 3-year old granddaughter. On that occasion, a woman called and asked her if she was okay. She told them she was fine and that her granddaughter had pressed the alarm. She said the lady thanked her and they reactivated it. Sheila added that it made her happy to know that they were being aware that she might be in distress. Sheila asserted: "Nothing will prevent me from using my PERS unless I can't get to use it. But I'm going to use it as long as life is in me."

#2 Valerie's story

Valerie is a 68-year-old Black West Indian female who lives alone since her separation from her husband who returned to the island he was born on. According to her medical record she has a history of falls due to a right leg injury sustained from an automotive accident two years before the study. She wears a leg brace and uses a walker, which she states is helpful when her foot is painful and swollen, and outside her home. Valerie admits she does not always comply with the pain management recommended by her primary care provider. Her VNS medical records states that she has a HHA three days per week, and visits the Adult Day Center two days a week. Valerie said she received a home visit from a VNS nurse who told her that she

should get a PERS unit because “it would be good for you” and she agreed to subscribe to the system for the past two years. Valerie admitted to falling at home and has activated her PERS twice. Valerie said her PERS is useful because “it is good, if she has to call people who ask her what’s going on and because they tell her they will send somebody.” She states the PERS has been useful because the injury from the auto accident causes her left foot to buckle and sometime fall. However, Valerie was not wearing it during the interview and stated that the visiting nurse said she should wear it at home. Valerie described her PERS as; “Very simple. You just put it around your neck and anything wrong, you press it. Because I have the big machine to it right out there so I press it and they answer.” She takes it off when she’s showering because she doesn’t want it to get wet. Valerie recalled her purpose for adopting the PERS after being discharged from the hospital: “They send...I think she was a nurse but I am not sure, she came here and ask me, “This here would be good for you.” I told them I don’t want it, but she explained it to me so I took it. She said it is very helpful for people that fall down, people that have nobody in the home and anything happen you could call and they would come. She said I suppose to keep it around my neck at all times. You think I do that?” Valerie stated if her foot gets better she won’t need it. They gave her pain pills and they don’t work and she doesn’t use them, but she knows when she has severe pain she could call people. They could come and give her either the injection or they could take her to the hospital. Valerie says she wears her PERS every day, except when does not go anywhere and on those days she puts it on the table or on her pillow on her bed. Valerie said that sometimes she does not wear the PERS unit when she is angry at herself, such as after a fall and sometimes when she is angry towards her mother who “torturing her” about not wearing the pendant.

#3 Laurie's story

Laurie is a 70-year-old Black American widow who lives alone and according to her VNS medical records has a history of falls, syncope, vertigo, and arthritis. She has two PERS units for the past three years. According to her records she uses a cane and that visits the senior center twice per week. After a hospitalized following a fall four years ago, she was introduced to the PERS unit at home by a VNS nurse and subscribes to it. Laurie said her PERS has been very helpful. She was not wearing it during the interview because the visiting nurse told her it was only to wear at home. She is glad she doesn't have to use it all the time, but mainly when she is alone and has dizzy spells. Laurie said she has fallen at twice since she has the PERS, but she doesn't wear it or mash it [press it] if someone is there with her.

She said it's not like it's hard for her to use her PERS anyway if she has it on. Laurie said her unit was simple just knowing she could keep it on, and the feature that made it simple to use was just having to "mash" (press) the button. But one thing, she has gotten used to having it. She admits one time she accidentally activated it. Laurie said is glad to have it. She said she does not wear the button in the shower and have the loop right by her bathtub, and she has a little thing on the wall where she could just reach and get her button. Since she lives alone, Laurie said she could keep her bathroom door open so she could yell to the box that's on her table. She said she got the PERS because she had dizzy spells and fell out, and sometimes don't remember falling, and used to ask her daughter if she fell.

Laurie stated that it's not as bad as she imaged it was going to be have it, thank God, but she has had them. She recalled a scenario in 2009 which caused her to retire early: Laurie said she took the train to work and fell out in the street and that was no good because she could've gotten hurt. She hopes to continue utilizing her PERS as long as God let her live, and wouldn't

take anything for it. Laurie stated that never having to press the button meant not utilizing it, and uses it once a month just for testing because they said she should test it at least once a month. She added; “Thank god so far I didn’t have to call them for that. I only fell 2 times since I had the button.” Laurie said sometimes they call her to see if everything alright and she likes that a lot, you know. If something happens to her hands, or she hopes not, or something like that. Other than that, there’s nothing. And she loves the homecare nurses too.

#4 Angela’s story

Angela is a divorced 76-year-old Black woman from the West Indians, who lives with her daughter. Her VNSNY medical records state she has a history of falls, vertigo and arthritis, and uses a cane and rolling walker. Also, her medical records state Angela has a HHA four days a week, visits the Adult Day Center three times a week, and has a PERS unit for about two years. Angela said her PERS is very good because if in case she is home alone she can press it and get help, and has never worn the PERS neck pendant but keeps it at her bedside. However, she was not wearing it during the interview because the visiting nurse she it was only to wear at home. She said she has never activated the button in an emergency situation, but admits to pushing the button twice to test if it worked. She said the first time she tried it and it was not working so she called somebody and they sent somebody who arrived in two hours. The second time she pushed it she was cleaning it and accidentally set it off. She said the second time they called her to find out if something happened and if she needed help. She told them it was an accident and she was okay. Angela said the PERS unit was very simple to use. She admits to “blocking out” and falling, in her words: “Well, sometimes you know people will just sit down and they faint away. Or they may go into a little sleep and they don’t even know what’s going on. So that is what I really mean.” Angela said the PERS unit was very useful, and that’s why she decided to get one.

She recalled the day she decided to get the PERS unit was when she told the nurse “what really happened.” She was on her bed and the whole place was going around. She started vomiting and she didn’t know what was going on. She didn’t have anyone to call, and she couldn’t even call her daughter in her room. She went to the doctor the very next day and the first thing he said is vertigo. The doctor sent her to the hospital and she was admitted for 5 days, and that’s when she heard about it and agreed to get one. The homecare nurse introduced her to it and saw that she got it. Angela said she doesn’t want to do without it because most times when the people send an Aide for her it’s she alone in the house. Most times she has to call them and ask them, “What’s going on. Where is the Aide?” However, she said since she had the PERS unit she never had the cause to use it, and wanted to know if she didn’t use it would they take it back? I asked her what would make her stop using it, and she replied “nothing.” I attempted to reassure her that they won’t take it away from her unless she told them she wanted them to take it away adding that the PERS unit is a life-saving device and referred her to the Center’s Director for this issue.

However, Angela said she was not quite ready to talk to him about it, and talked about her leg problems and losing balance, and about when to use the cane or the walker outside her home.

#5 Mary’s story

Mary is an 87-year-old single, Black West Indian female who lives alone. Her VNS medical records states she has a history of falls and sciatic pain, and uses a walker and a wheelchair. In addition, her medical record states that she has two PERS units for about four years and visits the Adult Day Center twice a week. Mary states she uses “the button” when she falls. She was not wearing it during the interview because she was told by the visiting nurse to only wear it at home. She said she recalls falling four times. Before she had “Life Alert” she fell two times, and since she’s had the Life Alert she fell two additional times and she called Life

Alert. She said she needs it because she has a problem with falls. She recalled the first time she fell at home and did not have Life Alert. She was sitting in her wheelchair that's a problem when it wasn't locked and she rushed herself to take a magazine and fell on the side that the lock is not good. She called 911 immediately because she tried to get up but her buttock didn't move because it was numb. The firemen came and they help her to stand up because she couldn't stand up. They asked her if she wants to go to the hospital, but she said she did not want to go. The homecare nurse introduced her to the PERS unit and put it on her neck. She said she could not keep it on because she's is always moving around. She doesn't wear it at home, but keeps it on her table. She said, "I don't want to keep in on my neck all day because I'm moving." She said it was most helpful when she falls, and then she uses it. She doesn't use it in the shower because she has one by her bathroom. If she falls out the tub she can have access to the one she keeps in the bathroom. She said it was simple to use and that she needs it. She recalls one time when she fell and they had to help her to stand up and ask her if she wants to go to the hospital, but she said she did not want to go. She described her falls as only accidents. Mary said she intended to continue using her Life Alert as long as she lives alone. She knows that if she falls she will probably not be able to get up by herself. So if she fall and no one is around, she push the button. She did not have any friends in her building and no family in her area who she could call to help her. She recalls one time when the super of the building eventually came and helped her. She was happy to have the PERS because many people need one but don't have it. She said, "I praise the Lord because one time when I fell I called a friend. They said to me, "I'm in Manhattan, and I can't come to help you." She called other friends but they said they were at work and could not come. Mary said without the button she used to use the telephone or a cell phone to call for help, but now that she has the button, she only uses it. She doesn't call friends to help her since she has

the button. Mary said the only problem she had was falling, that's why she is glad to have the button.

#6 Nancy's story

Nancy is a 78-year-old widow of Middle Eastern descent who now lives alone. Her son lives out of state and her daughter lives in the Middle East. Her VNS medical records revealed a history of falls, lower extremity weakness, and the use of a cane and walker. Additionally, her medical record states that she has two PERS units for about three years and visits the Adult Day Center twice a week. Nancy said she uses "the button" if she can't breathe. Sometimes somebody answers her, and it may be the police. She said they ask; "Are you okay?" Sometimes she needs help, you know. She admits that sometimes she sets off the device when she is cleaning it. She recalled that one time somebody came to her house and asked her, "You need help?" She tells them that she made a mistake and that she is fine. Nancy was not wearing the PERS neck pendant during the interview and stated that the visiting nurse said she could only wear it at home for emergency.

She finds it simple to use the button if something happened. Nancy said sometimes her legs are numb and she can't stand up and can't open the door. Sometimes she needs somebody else to push the button. She described a scenario: She pushed the button and it beeped while she waited for somebody to help her, and she told them her legs are numb and she can't stand up. Tearfully Nancy also recalled the scenario when she fell in the street and hurt her neck and knees. She said nobody helped her and thanked God she could stand up. She doesn't want anybody to see her on the floor, and thanks God when she is okay. She recalls the day a woman came to her house and taught her about how to use the button and when to put it on. She said she expects to continue using the button because if something happened to her, somebody that she

can trust will come to her. Even though she stays alone in the house and nobody is with her, she said God is with her. Nancy said she puts the button on when she goes to sleep, and if anything happens to her she could push the button. She also said if she can't stand up she could push the button and tell them she needs help. She thanks God everything is okay and nothing happened to her. Nancy said she doesn't use the button in the shower because she has a button there to push, but she wears the button just in case. She doesn't push it unless she really needs someone and puts it on her neck or leaves it on the table.

#7 Esther's story

Esther is a separated 71-year-old Black American who lives with her son. Her VNS medical records revealed a history of falls, stroke, and asthma, and the use of a walker and wheelchair. In addition, her VNS medical record states she has a HHA twice a week, and subscribed to the PERS unit four years ago. Esther said she visits the Adult Day Center about three days a week. Esther said the button was good for her since the nurse came and explained it and gave her therapy for her legs which wobble. She reports having almost no strength in her right leg. Esther said she was not wearing the PERS neck pendant at this time because the visiting nurse said it was only to wear at home. She had been in a hospital for two years after her stroke. Esther recalled going food shopping with her daughter after work one day: When they returned home, Esther said she was eating and, "the next thing I know was on the floor and I couldn't get up. I couldn't move, and my daughter was trying to pull me up. Every time she pulled me up I slide down. So I say, "Don't try and pull me. Call the ambulance." Esther said she was worried she might hit her head next time.

She said she was discharged from the hospital in 2010 and received "the machine for her heart" which she keeps at her bedside. If something happens she hits the machine and it goes off

then the ambulance comes. She said this has happened twice. Esther said one time she was coming down the steps and fell. Esther said she was checked and they told her she did not have any broken bones. She said the button is simple to use - if you can't help yourself, you call for help. She said she plans to keep it until they tell her she doesn't need it anymore. Esther said she likes to have the button because she could get some help. She uses it like if she can't breathe or can't cough because she has asthma. When she goes home she puts it on because she moves around in the chair and keeps it on. She puts it in her dresser until she takes a shower because she has a button in the shower too. She doesn't use it, but the only time she does use it is when she got to use it, like in the situation with a fire or something. So she'll use it if there is a fire. She said she has never pressed the button when she didn't need to. Esther said she needs the button when she goes out or either shopping or something so she takes it with her, it's the only thing she has. She's trying to walk. Her son tries to help her walk but she tells him no, that she might fall, and she's afraid she's going to fall. Esther said her Aide also tries to help her, carry her, but she doesn't want her to hold her hand. The Aide wants her to go by herself and she tells her she can't do it by herself. She can't. She needs somebody to help her and she wants to come to the Center all the time. It's going on two years and she needs the exercise.

#8 Manny's story

Manny is a 79-year-old separated male from the West Indies who now lives alone. His VNS medical records indicate a history of chronic prostate and kidney disease, and degenerative joint disease. Additionally, his medical records show he uses a rolling walker, visits the Adult Day Center twice a week, and subscribes to the PERS units. Manny said "Life Alert" is very good. He presses it and they ask what's wrong and sometimes they come and take him to the hospital. He was not wearing the neck pendant during the interview, but stated he wears it all the

time. Manny said he has pressed the button twice. One time the machine was not far from him. He doesn't wear it when he takes a bath because in the bathroom there's one button there. One time, he said, the nurse came to see if it's working. Both times he used the button they took him to the hospital and was diagnosed with urinary retention because of his prostate. He thinks he has been using a PERS device for five or six years. He recalls that they came and changed the box twice since he had it.

Manny said the button is easy to use: "You don't have to worry about anything - just press the button." He needs it and plans to keep it. Manny admits he still has problems urinating and needs to use a catheter at times. He said it was hard because he was living alone. "The button is very, very, helpful. I have one in the kitchen, one in the bedroom and one I wear." Manny said, "The button is very simple. If you don't want to get up, you lie down and you press it. Then the machine talks to you. If you say you are very sick, they send an ambulance." Manny said he needed an ambulance twice. He said his purpose for getting the button was because of his medical problems and he expects to continue utilizing it because it's there. He said it's working, so he will keep it because when you're alone that's your company. It's on his phone in his bedroom, in the kitchen, and in the Sitting Room, so where ever he is the phone is there too, because if anything, he can move at any time. If an emergency takes place then he'll use it. He could not image anything that prevents him from using it. If you fall, slip and fall and you can't get up, you got to use it."

#9 Maude's story

Maude is a 90-year-old Black American widow who lives with her daughter. According to her VNS medical records she admits to falling, has a history of vertigo, osteoarthritis, knee pain, and uses a cane and rolling walker. Also, according to her medical records, she has a HHA

six days a week, two PERS units for four years, and visits the Adult Day Center on Wednesdays. Maude said that she and her husband had decided to get the “Med Alert” four years ago. She said her Med Alert is very helpful because any emergency she press, or they press the button and there come by ambulance to take her to the hospital. During the interview, Maude was asked if she was wearing the neck-pendant, and she replied the visiting nurse told her she could only use it in the house. She said she pressed it once when she had a fall and hit her head and they took her to the hospital. Since living with her daughter she has used it twice, once when she had chest pain. Maude said she doesn’t wear it on her neck. She hangs it on the bed because she doesn’t want to accidentally just keep pressing and touching it. She has a button in the bathroom too, so if she has a fall or anything in the bathroom.

Maude said when she first got it she wore it all the time, then she stopped. She said she would not put in on her husband, because she thought he would call them all the time, so now wondered if that was wrong. Maude said she does not wear the button in the shower and was not sure if it could get wet. Maude said her PERS unit is helpful because it’s for emergencies; the fastest way of getting assistance to the hospital or the doctor. It’s simple because all you have to do is just press the button. She likes that because you have it on your person and wherever you are, if you have it there to press it, and thinks it is very much assisting. Maude said she didn’t know for sure if she needed it, but the nurses and doctors think she needs it. She said she planned to continue using her PERS because she is getting older and that when she stands up she gets up she feels dizzy, you now, so she thinks she needs it. She wouldn’t use it except there’s an emergency for it, and except for the time when the nurses come and they would test it, but she doesn’t test it. She’s been utilizing it around the house around her neck, and that’s the truth.

Nothing could prevent her from using it. If she could, then she would wear it, although she just don't want to be accidentally pressing it and then, you know.

#10 Barbara's story

Barbara is a 72-year-old divorced West Indian female who lives alone in the same apartment building as her daughter. Her VNS medical records noted a history of falls, vertigo, rheumatoid arthritis, and asthma, and the use of a cane and rolling walker. Also, according to her medical records, she has a HHA six days a week, visits the Adult Care Center two days a week, and has subscribed to the PERS unit for eight years. She said the PERS is very, very good because when she calls them, even if she's only testing it, they call back right away. She said she had had it for eight years, since she has been living alone. Barbara was not wearing the PERS pendant during the interview and stated that the visiting nurse said it was only to wear at home. Barbara recalled using the button when she wasn't feeling well. She was lying down and the whole room was spinning, and she pressed the button and they send an ambulance. She was taken to the hospital and was told that she was just a little dizzy. Barbara said the PERS is useful because even though her daughter lives upstairs, she is not always home and she is busy with her own children. She admits she sleeps with it under my pillow.

Barbara said the button is very simple to use. She wears it around her neck and one day she was trying to open a jar and she missed and pressed it, and then it started on. She doesn't wear it when she's showering, but she knows they have some that say you can. She said they just came to change the device because the one she had was giving her trouble. She says she tests once a month, but sometimes she forgets to test it. The nurse ordered it for her because since she was by herself. That's why, in case she get sick or something. She doesn't know what happens, but sometimes when she gets in bed and lays down the room begins spinning. She said it's good

to have, in case there is an emergency, after her Aide goes home. Her grandson works and goes to school and her daughter and her husband work. It means a lot for her to have the PERS because when nobody is there and she's not well she can't do it. She doesn't utilize it unless she needs to. Barbara said she doesn't wear it around her neck at night because she turned and don't know if it was her hand or something and it went off, so it even woke her up and she was like, "What happen, what happen?" She realized when they called she pushed the button by accident, so that's why she keeps it underneath her pillow where it's right there and she can, you know, press. Barbara said the only thing can prevent her from utilizing the button is if she's there and don't able to press it. If you get sick and can't able to press it or something, that's the only thing I worry about. She said she could not think of any reason to stop using it. Barbara said it's good, it's a good machine to have in the house, because if you fall, you're by yourself and you fall, and you can even drag it you know push it, and they ask you as the commercial says, "You fall and you can't get up."

#11 Phyllis' story

Phyllis is an 88-year-old widowed Black American who lives alone. Her only child, a daughter, lives in Michigan. Phyllis' VNS medical records show she has a history of falls, arthritis, asthma, dizzy spells and uses a cane and walker. Also, her medical records state she has a HHA three days a week, visits the Adult Day Center twice weekly, and has subscribed to a PERS unit for eight years. Phyllis said her "Alert" button has been very, very good because she fell twice in the house. She was not wearing it during the interview because she said the visiting nurse told her it was only to wear at home. Phyllis said, "My daughter went to the store and just that quick, I don't know, I was feeling alright and everything, but all of a sudden, I guess I just blanked out or something, I don't really remember. And I was on the floor and I couldn't get up."

So when she came in the house I said, “Linda, I am on the floor. I fell and can’t get up.” She couldn’t get me up because you know I’m heavy. So she pressed the button, the alarm, they came on and asked her. She told them that I fell and I couldn’t get up and she couldn’t get me up. They came right away, I was out completely. They took me to the hospital and everything and later told me my sugar was 29. But I didn’t have any signal that was going on.” Phyllis recalled the second time she fell was in her bedroom and all of a sudden she just went out and she was on the floor. This time she was alone and was calling her friend and someone was passing by and heard her calling for help. They knocked on the door but she couldn’t get up to even unlock the door. She did not think she hit anything. She just went down on the floor. Phyllis said she crawled for a few minutes and finally was able to unlock the door which was hard to reach to unlock because she couldn’t raise her hand up so much. She told her friend to activate the button and they came in a few minutes and took her to the nearest hospital.

Phyllis said she keeps the button on the nightstand by her bed. And the one that she could wear around her neck she keeps it on the head of the bed where she could reach it at night and she wears it in the daytime. She doesn’t wear the button in the shower because she has a button on the wall in the bathroom. Phyllis says the PERS is helpful for her just in case like the fact that she fell, and it’s a blessing. She also finds it a very simple thing to use, and very available, but admits to feeling wobbly. She adopted the PERS because the nurse that she had told said that she should have had it long before she got it, because she was here by herself. She had the PERS for over two years now, and tests it once a month, and if someone answers she just tell them that she’s testing it.

Phyllis expects to continue utilizing her PERS because she really needs it, because she doesn’t want to fall in the house and don’t have any way of getting help but hollering. She said

they also told her to use her walker. She said she has to take her time, and can't just turn around or do something so quick that gets her off balance. Phyllis said she also had a cane, but they had told her the cane is really not too helpful for her. She said that sometimes he crawls on her knees to be safe, until they get painful. She said she was happy to get Access-A-Ride. She recalled calling her friend to help her activate the PERS. Phyllis recalled the conversation with a nurse who encouraged her to get the PERS eight years earlier and to visit the Center; "When you come in here you will like it. You will like it because you could come here by yourself." Phyllis said because she was very depressed the nurse told her to just give it a try even if she goes but one day a week, because all week she's by herself day and night. Phyllis said she did, and she loves it. She told her doctor that the nurse's recommendation was like dropping weight off her.

#12 Gladys' story

Gladys is a 91-year-old widowed West Indian female who lives alone in the same apartment building as her daughter. According to her VNS medical records, she has a history of falls, stroke, osteoarthritis, and uses a cane and rolling walker. Her medical records also state she has a HHA five days a week, visits the Adult Care Center two days a week, and has two PERS units for about three years. Gladys said she has not used her "Med Alert" button, even though she admits to falling twice: Once at home while alone, "but I didn't have to call emergency." The second time while outside walking with her Aide and became frightened by a dog that rushed her. She said her Aide took her to the hospital and but there was nothing wrong with her. Gladys said her Med Alert is most helpful because, "I look at that as if I'm home alone and I get a fall and I'm near to it and whether I wear...they gave me a wrist to wear around my hand. I can always push the button and somebody will come and rescue me."

Gladys said her Med Alert is simple, just squeeze, and press the button. Yet, she was not wearing it during the interview because she was told by the visiting nurse that it was only to be worn at home. She and the HHA check it once a month by pressing it and see if it works. She presses it and anywhere she is the machine will make a sound and you will hear the person on the other side say if she needs help, and she says “no, she’s just testing.” Gladys added that they told her to do it once every month, but sometimes she does it every two months or so. She said the Med Alert is simple to use because she has one in the bathroom and one she wears on her hand. To her it’s simple because if she needs help she could just press it if she’s alone and need help. But thank God it hasn’t happen, and she doesn’t need help. Gladys said her purpose for getting the Med Alert was because “everybody say it was necessary for me to have it just in case I’m alone.” She said the visiting nurse explained to her why she should have it, in case she’s alone at home and needs help, and falls and doesn’t have any help. She expects to continue using it if she needs it. If she’s alone at home and need help, any kind of help, she will have to use it because her daughter and granddaughter work. When the Aide leaves at 1 o’clock she’s alone and she always has her button just in case. Gladys said she will utilize her Med Alert if she needs it, but if she don’t need it she won’t use it. If she needs it she will use it because she’s alone most of the time. She said sometimes for months she don’t use it. She don’t use it because thank God she can move around and she don’t move slowly, but she moves cautiously because she don’t like to fall because her bones are “not too young and they will break.”

Gladys said she uses a walker and a cane since 2001, when she had a right-sided stroke which affected her right side, but didn’t like to do the exercises. She said the exercises “looked so stupid” but thanked God it helped because now she can bake again. Gladys said she doesn’t see anything to prevent her from using her Med Alert because she wears the watch, the wrist on

her wrist. Or if she's in the bathroom, there is one there if she needs help. So, nothing could prevent her from using it if she needs it. If she doesn't need it she don't use it. She added if there's a case when she don't need it, especially if the Aide is at home, if there's not an emergency she wouldn't use it because if she needs assistance she assists her. She said there was never a time that she needed it and don't use it because she never have to use it.

#13 Betty's story

Betty is a 91-year-old Black West Indian female that lives alone and is separated from her husband for several years. According to her VNS medical records she has a history of falls, osteoarthritis, glaucoma, and uses a cane and a walker. In addition, her medical record shows she has a HHA four days a week, visits the Adult Care Center two days a week, and has two PERS units for about three years. Betty said she has never used "the button", but sometimes they call and ask how she's doing. She said she usually tells them she is fine and she does not need any help. Betty said she couldn't recall how long she has had the button for sure, but said it was very helpful, because she would have it if necessary. She admitted to falling one time at the Adult Day Center when she went to the bathroom without her cane, and said she has not fallen at home. She said that when she is at home she only uses the cane, "now and then." However, Betty was not wearing the PERS neck-pendant because she was told by the visiting nurse she should wear it in the home. She reported that she can walk around by holding on to a chair and things like that.

Betty thinks her button would not be hard to squeeze, and that she has one she can wear around her neck, and one for the bathroom. She admits the one for her neck she keeps near to her telephone. Betty said what she likes about the button is if she falls she can call someone, and if she does not she does not need it. "The button is a good thing in case of an emergency - you squeeze it and somebody ask a question." Betty said her purpose for getting the button was

because “they gave it to her just in case.” She recalls a man brought the box to her home and a VNS nurse explained it and told her whenever she needs it what she could use it to get help. She expects to continue to use the button, in her words: “It’s no problem to me. If I have it, you are in touch with reality.” She recalls once the police called her and asked, “Are you alright?” because sometimes they call to find out. Betty said sometimes the calls are unnecessary, I just tell them I am alright. In terms of utilizing her button, Betty said she doesn’t press her button because she doesn’t need it. She said if she feels pain or she can’t manage than she would use it, but if she’s going along inside the house and the helper is there, she don’t believe it’s necessary.

Betty said what might prevent her from using the button is if she lost her electricity. Betty said she would use the button when she’s sick. She said she got it should in case of emergency she could touch it and get help, and described a scenario: “You have to feel pain before you use that thing. You not feeling sick, why would you trouble it? You have to wait until you need it before you call.” Betty added: “It’s no trouble. It’s a good thing to have it there, especially when you live alone.”

#14 Ruby’s story

Ruby is an 89-year-old widowed Black American who lives alone and her only child, a daughter, lives in the same apartment building. According to her VNS medical records, Ruby has osteoarthritis, and uses a cane and rolling walker. Also, according to her medical records she has a HHA four days a week, visits the Adult Care Center two days a week, and has had a PERS unit for about three years. Ruby said her “Medical Alert” is “good so far, but she admits “I have never had to use it” What makes her Medical Alert most helpful for her is that if she gets sick, she would use it to call a doctor, for her that is helpful. Ruby said her Medical Alert is very simple, “All you have to do is push a little button.” The only time she ever pushed the button was

when they were showing her how to use it. Ruby admitted to not wearing the PERS pendant at this time because the visiting nurse said it is to be worn at home only.

She said that they recently came to give her a new one. She said she has one by her bed and one in the bathroom. Ruby said the feature she likes about the button is that if she would pass out or get dizzy or something, or fall, it would go off. She said her purpose for getting the button two years ago was because her visiting nurse came to her apartment and gave it to her because she might probably need it “ Because she said I was getting up in age and I might fall, or might get dizzy or what have you.” Ruby said she was 89 years old and never fell in her home or outside the home. She said that because of her age it is a good thing she has it and she will continue to using it. For Ruby, using it means a lot. She said for instance, if she gets sick she could push the button, you know. If she’s out and she falls, she could push the button, you know, and she could get help. Ruby said the first one had irritated her neck and that she wears it in the house sometimes, like for instance when she’s cooking, but not when she takes a bath. Ruby said she doesn’t use her button because she has not had to. She reported that they came to test it about three weeks before the interview. “I don’t know what might prevent me from using it. If I don’t need it why use it, right?” She doesn’t know any situation which she would not use her button. Notably, all participants either declined to be re-interviewed, read their transcript for clarification, or both. The next section will address the five objectives of the study derived from the TAM as they relate to the analysis of the data.

Objectives of The Study

The objectives of this exploratory descriptive study were developed from the five constructs of the TAM model. The five constructs of the TAM model are: 1. Usefulness - The degree to which an individual believes that using the system will help him or her to attain gains

in job performance; 2. Ease of Use - The degree to which a person believes that using a particular system would be free from effort; 3. Intention to Use- A person's formulated conscious plans to perform or not perform some specific future behavior; 4. Use - An individual's positive or negative feeling towards performing the target behavior; and 5. Barriers to Use - Obstacles that may prevent an individual from completing or continuing a specific task, will be explored from the perspective of the PERS phenomenon. The constructs were analyzed as objectives because these participants were not in a work setting, and their goals are personal objectives and not enhancements of their job performance (Davis, 1989).

Objective 1: Usefulness

All of the participants saw the PERS unit as useful, in one way or another. For example, some said "the button is a good thing" because during an accident or fall or some other such event, just pressing the help-button will access them to emergent care, and if necessary, transport them to a hospital. Several participants also said the button was a key resource because of less worry. It was also found to be reassuring when worn, or within their grasp, despite the type they used. For Gladys, the only participant with a wrist device, her reassurance with the PERS relied on just pushing the button to get help if she's alone at home. Two participants felt their PERS unit was helpful even though they don't always use it, and was reassured by just pushing the button when feeling dizzy (Laurie), or can't breathe (Maude). Another useful function of the device was testing it on a monthly basis as suggested to the participants by the VNS nurse and Call Center representative. For example, Angela activated the button once to see how it works and found out it was not functioning, and as soon as she notified the Call Center of the unit's malfunction, they repaired the unit immediately. Also, Betty had never used the button, but the nurse tests it by calling the Call Center. An added reassurance for Betty and Laurie and Betty, is

that the Call Center also calls to find out if the button is working and if they are okay. Likewise, Ruby has never fallen in the house, but stated she knew the button was useful in case she did fall. Barbara relies on the button's usefulness by pressing it and then determining whether she needs to notify her family. A few participants such as Manny, Maude, Phyllis, and Ruby, also described the usefulness of the button as being very helpful when used during an emergency while Phyllis expressed the usefulness of the button as a blessing the first time she fell at home, activated it, and received immediate care from EMS.

During the screening phase, almost 13 participants stated they had a neck pendant, and one participant said she had a wrist device. On observation during the interviews, none of them wore either the neck or wrist device. This was confirmed during the interview when the researcher asked the participants if they were wearing the device at that time, and they all replied "no." Overall, the participants had similar reasons why they didn't wear the device outside the home such as: it is only to be worn in the home; they are not supposed to wear it outside the home; if they wear it outside the home and something happens to them they wouldn't be able to get any emergency help; and, the operator wouldn't be able to hear them. However, only one participant, Ruby, was interested in getting a neck pendant to wear outside the home and the researcher referred her to the Center's Coordinator for this issue.

In summary, all the participants found the button to be *very useful*. Overall, all participants had positive experiences related to the *usefulness* of the PERS unit, whether they had an urgent or emergent situation, or they were just testing the unit.

Objective 2: Ease of Use

In response to this second construct, Ease of Use, almost all the participants (Sheila, Valerie, Laurie, Angela, Mary, Esther, Manny, Maude, Barbara, Phyllis, Gladys, and Ruby) had

described the PERS unit as simple. Maude described the simplicity of the button as being able to push it, while Betty stated it's not hard to squeeze. Varied reasons for the *ease of use* of the button were expressed by these participants; you could just put it around your neck (Valerie); it's not hard to use (Laurie); you are capable of using it (Angela); you need it (Mary); you could call for help (Esther); you don't have to get up to press it (Manny, Esther, Barbara). Overall, most of the participants stated the button was easy to use in any room because it functions by just pressing, squeezing, or pushing it.

Despite the participants' statements that the button was *easy to use* in terms of wear, room location, and activation, still, most of them said they don't wear the button, and a few participants stated they have never pressed (Phyllis); squeezed (Betty), or pushed (Ruby) the button because they never had to use it. Additionally, it was reassuring to all the participants that it wouldn't be hard for either a relative or HHA to use the button when needed because they received instructions on the features of the PERS unit from the visiting nurse. Also included in this construct were the participants' comments regarding the feature of the PERS unit which elicited several themes such as; love it and glad to have it (Valerie), it became very useful (Angela); you could just turn and reach it (Mary); you could just press the pad (Manny); it's simple enough (Maude); it's easy to come on (Barbara); you could check it to see if it works (Gladys), and when you squeeze it, somebody asks a question (Betty). Ruby added, although she has never used the unit, a reassuring feature of the button was just to press it every month to see if it works because the nurse taught her how to activate it.

In summary, ease of use of the PERS unit was described as simple to press, squeeze, or push, the button. Also, it is a unanimous response among the participants that the simplicity and

feature of the PERS unit were two significant characteristics that contribute to its ease of use, despite their reported non-wear and/or non-use.

Objective 3: Intention to Use

In terms of the participants' *intention to use* the PERS, almost all stated that they were aware of the PERS through television, and two recalled the commercial where an older woman had fallen at home and the phrase: "Help. I've fallen and I can't get up" This phrase is registered by Life Alert, another major pioneer in PERS industry since 1987 (Life Alert, 2016). However, more importantly, almost all adopted the program through the visiting nurse. For most participants, they were introduced to the program and device during their periods of hospitalization, primarily due to falls. Being vulnerable to injury, a few participants stated they received their PERS units because of falls inside and outside the home (Sheila, Laurie, Mary, Nancy, Phyllis). Sheila, who lives alone, recalled her introduction to the PERS at the hospital after her second fall (once at home and once outside the home). She said the visiting nurse came and assessed her home and enrolled her in the VNSNY CHOICE program and also because she lived at home alone, she should get it "just in case."

For participants who live with family, the intention to get the device was based on the shared concern of their safety at home especially when alone. For Angela who faints, during one of her episodes of dizziness at home she could not call her daughter who was in the next room. During her brief hospitalization for this, the visiting nurse introduced her and her daughter to the program and device for which they are equally happy with their decisions to get it.

The majority of participants (Valerie, Angela, Mary, Nancy, Manny, Maude, Phyllis, Barbara, Gladys, Betty, and Ruby) stated the main purpose for getting the unit was because they lived alone and had some medical condition, and at least half were contributed to pain. For

example, Valerie stated she was in a car accident and sustained a serious leg injury and is treated for chronic pain. Once discharged to her home, the visiting nurse came and discussed the benefits of the CHOICE program and the PERS device, emphasizing to that since she was at risk for falling, the unit was also very useful for her. For Mary, her history of chronic back pain and fall were the deciding factors for the visiting nurse to discuss a subscription to the device, for which she states she expects to continue using.

Two participants, Phyllis and Gladys, recalled the visiting nurse telling them they needed the PERS in case of sickness or something; and should have had it long before (Phyllis).

However, nine participants (Sheila, Valerie, Angela, Mary, Esther, Manny, Maude, Barbara, Betty), reported that the visiting nurses told them that it was necessary to have it, get it in case. For some, such as Maude, Betty, and Ruby, they were told by the nurse that they might probably need it because of their ages. Maude, who is 90 years old, said the nurses at the hospital told her that because of her age, knee pain, and vertigo she might need it. Whereas, 91-year-old Betty who stated she has never fallen, recalled the visiting nurse giving it to her because it would be useful since “she was getting up in age and might fall.” However, Laurie recalled no one asking her if she wanted the PERS unit, but she had a history of falls, and since its installment she was glad to have it and expected it to be useful for as long as possible, adding that her daughter was also relieved that she had it.

In terms of expectations with *continuing to utilize* the PERS unit, overall, most participants stated they will continue to use it because they are alone, it's their company, because of their age, not wanting to fall, medical conditions, getting better, and being able to test it themselves or having someone test it for them. For example, Barbara said although the button was good to have, she could do without it, and just checking it at least monthly was sufficient for

her. Betty summed up her sentiments for the purpose of having the wrist device and her expectations when the nurse and Call Center representative test it:

It's no problem to me. I need it should in case. If I have it you are in touch with reality. Once you have it you know. Somebody, I think from the police station, ask, "Are you alright?" You know sometimes they call to find out. They may get an unnecessary call and they say, "Are you alright?" and I say, "Yes." And, "when the nurse come she goes to the thing and say, "I'm the nurse and so forth," and they talk.

A few participants viewed their *continued utilization* of the PERS unit from a religious perspective, as stated by Sheila (getting better with God's will and continue wearing it), and Mary (living as long as God allows and not accepting any substitute devices). Mary summed up her experience with adopting the PERS unit and her expectation to continue utilizing it as quoted: "I need it because I have a problem. I fall. That's because I have Visiting Nurse. I have a spinal problem."

In summary, from a collective perspective, all the participants affirmed their intention to continue to use the PERS unit, at least some of the time. They expressed gratitude to the visiting nurses for assisting them and for controlling urgent and emergent situations as they continue aging in place more independently, despite some functional limitations. Also, their reassurances that family and HHAs are trained to utilize the PERS unit also seemed to be a significant intervention that may decrease caregiver burden during health emergencies.

Objective 4: Use

Most of the participants stated that "they didn't need it," or "haven't had to use it yet." For example, Gloria responded:

Well, I will utilize it if I need it. But if I don't need it I don't use it...But if I need it I will use it because I'm alone most of the time... Sometime for months I don't use it. I don't use it because thank God I can move around. I don't move slowly, but I move cautiously, because I don't like to fall.

Whereas, Betty stated:

I don't press it because I don't need it. Why press it and I'm okay? If I feel pain or I can't manage then I'll call. But if I'm going along inside the house and the helper is there, I don't believe it's necessary to call.

Reasons for not pressing the PERS button as yet were expressed by Ruby as not using it because she hasn't had to use it yet, and Laurie said not using the button means not having to press it. Ruby was interested in having a PERS to use outside the home in case she fell, and as mentioned in Construct I: Usefulness, this participant was referred to the Center's Coordinator by the researcher for this issue. In terms of how often they utilized their PERS system, most participants stated their reasons for utilizing it meant pressing the button. However, the least responses for the frequency of utilizing the button included wearing it all the time, having the Call Center test the system because it wasn't used, and not using it except there's an emergency for it. Mary presented a scenario for what it means for her to utilize the PERS:

Praise Lord I have it because when I fall, I call friends and they say, "I'm in Manhattan, and I can't come to help you." Or, "I can't come, I am at work." She added, "Now I have the button, I use only the button. I don't call anybody to come to help me again.

In summary, using the PERS unit meant pressing the button. An added reassurance to using it was that activation of the button was safe and convenient whether it was being worn or tested. However, most participants did not consistently wear their neck pendant or wrist device.

Objective 5: Barriers to Use

When the participants were asked *what might prevent them from using their PERS system*, the majority stated “nothing will prevent them from utilizing their PERS.” Participants cited several reasons why they might continue to use it. For example, Sheila said nothing will prevent her from using her PERS, and unless she can’t get to use it, she plans on using it as long as she is alive. Valerie said the button was very important to her especially when she fell, but admitted that she does not wear it at times when she’s very tired. She added that she tends to fall at times when she is not wearing the button. While Angela said she would like to keep it as long as possible, so far she hasn’t used it. A few participants also stated they didn’t need it at this time, but have it in case they fall, such as Mary, Gladys and Ruby. For example, Mary mentioned that nothing happening or nothing being wrong might prevent her from utilizing the button. Other than that, she would need the button if she fell. Whereas for some, their example was if nothing happened (Nancy); or if nothing is wrong with you (Manny). Maude said if it’s not an emergency, she wouldn’t use it, other than accidentally. Other reasons included, hasn’t happened yet (Maude), and possible sickness (Ruby). For Betty, the issue of no electricity was a major concern for her. She verbalized that her fear of not having electricity in the home could result in no emergency care if she needed it, or that she could be cut off from the operator during an emergency call. Or even worse, she could call for help and not receive it.

Two additional questions were asked as they related to *potential scenarios to barriers to use*. The first question asked: “What is a potential scenario when you would not use your PERS?” Most of the participants’ responses were varied, and included: no scenario (Esther, Manny, Barbara); if it’s not an emergency (Maude, Gladys, Betty); and the presence of family (Laurie), or Aide. As Gladys stated, if the home health aide is there she would not use it

because the Aide is there to assist her. For other participants, potential scenarios included accidental activation (Sheila); never having cause to use it (Angela); sitting doing nothing (Mary); able to stand up alone (Esther); and don't know (Ruby). For Ruby, she does not know which situation could prevent her from using her PERS unit.

The second question related to *Barriers to Use*, "Have you encountered a scenario when you could have used your PERS but decided not to?" elicited a variety of participants' responses also. For example, the responses included: fell and had no injury (Laurie, Nancy). Laurie stated she has fallen at home alone and in the presence of her daughter, and did not use the button. However, if she had pain or some injury, they would just take her to the hospital and not use the button. For some, pain or sickness (Valerie, Angela, Nancy, Maude, Phyllis, Betty); never (Barbara, Gladys); falling and not wearing the unit (Valerie); hasn't happened yet (Laurie); having it taken away (Angela); will use it (Maude), and not able to wear it outside the home (Ruby), were reasons for non-utilization of the button.

In summary, no participants said they were embarrassed to wear the PERS unit, and none reported that they did not wear it so as to not be taken to the hospital against their will or unnecessarily. The unit was also seen as safer and more convenient to use. Overall, almost all participants did not wear, and some did not activate, the push-button device after an incident such as a fall. Based on the exploration of the five objectives, the emergent themes are discussed next.

Thematic Analysis of Objectives

For the purpose of this exploratory-descriptive study, only the objectives of usefulness, ease of use and use of PERS will be used because the focus is on the use of the PERS and not intentions or barriers to using the unit. Also, these objectives correspond to the relevance of the

purpose of the study and the research study question, “What is the meaning of a PERS use for functionally impaired older adults?”

Ultimately, this researcher believed that by reflecting on the relevance of these three objectives, a new meaning to the experience of use and ease of use of personal emergency response systems emerged from the participants’ varied responses and the researcher’s interpretations of them.

Theme 1: Reassuring presence

Several participants described the button as “a good thing to have” because they had experienced some disturbing or frightening event when they are alone, and they pressed the button and received timely assistance. In other words it worked, it alleviated stress, averted any potential crisis and worse outcomes. The participants’ statements regarding the unit’s usefulness were associated for them by the positive experience of its performance, and associated reduction in apprehension-they don’t have to worry so much. Most of the participants found the button to be helpful. For example Maude said, “It is helpful because you have it on your person and wherever you are, if you fall or something, you have it there to press.” Phyllis stated the button’s helpfulness was revealed in an emergency, such as when she was alone and had “dizzy spells.” And for Ruby, a potential emergency seemed to offer just as much reassurance, by stating; “I have to call for a doctor or something, to me that will be helpful.”

Several participants saw the button as a resource, especially important when they are alone. It was something that reduced their sense of being alone and loneliness. Angela said the button is the only thing she has to call somebody in an emergency. Most of the participants do not have family and friends around very much. Barbara stated, she usually presses the button first and then if necessary calls her daughter or grandchildren. It thus serves to reduce the need to

contact family and friends and serves to augment available family and instrumental social support. For most participants its usefulness and presence as a good thing is related to falls but also for other perceived needs. It is seen by most of the participants as something which helps them get to a hospital, and in Barbara's words it's "a blessing." Some participants felt comfortable that now that they had the button, it's the only thing they use during an emergency, because "I was glad to know that I had something, or at least someone there." It is a good thing in part because it is a communication device with the "Call Centers" who is thus able to check up on them. Barbara said that even if she calls to test the button they call her back immediately. Betty summed up her response with testing the button and why it was a good thing for her to have as, "I haven't used it, but they call when the nurse come and she speak to them or some time they call me and ask how am I doing if I'm okay, so I don't need them, you know."

In conclusion, the button is a good thing to have based on the participant's perception that it is a helpful resource not limited to falls or other emergencies. The participants reported that they were happy with their decision to get the PERS and what they said suggests that they saw it as related to the quality of their life and ability to stay at home despite their limitations. The recurring essence is that of *reassuring presence* which allows them to keep the PERS on them (wear), within their grasp, or use it (activate) during medical emergencies or testing. Based on the TAM construct *usefulness*, these participants believed that the system (PERS) helps them with maintaining the primary gain (reassurance) of the system's performance (good, helpful, resourceful) whether it is activated during an emergent situation or required testing of the unit. However, most of the participants admitted to not wearing the unit.

Theme 2: Simple and effortless, if you need it

The second theme relates to the perceived ease of use of the PERS unit, as well the intention to use. Several participants said it was simple to use because you wear it. Examples of comments related to this theme were; “You just put it around your neck” and, “Knowing that I have it on during an accident is simple enough.” Others said that once you have it on it was not hard to use. However, most admitted that there were times during the day, when they do not wear it, such as when someone is visiting or staying with them, this could be family or home health aide.

The simplicity of using “the button” was included for its immediate connection to medical attention. Participants saw it as the fastest way of getting help, if it is worn. As Maude and Mary said, if you are wearing the button and fall, it’s right there to press wherever you are. This simplicity was contingent on wearing it, which was linked to their perceived need for it. Some participants said “it’s simple to use, and I need it.” For some participants, in addition to getting medical attention, pushing the button also notified a family member or friend. The interpersonal connecting dimension of the PERS unit is discussed in theme three. The ease of use, if worn, as talked about by the participants, also can be seen as free from effort. Yet, most of the participants stated they do not wear the button. The third and last theme relates to the interpersonal relational dimension of the PERS program: Alone, but connected.

Theme 3: Alone but connected

All of the participants saw “the button” as a connection to other people. While most of the participants described their lives as active, some admitted that chronic pain reduced their ability to do some things and visit people. Wearing, and occasionally using, the button provides a connection to important others. For example, one participant said when she gets pain, she can get

people to call her, and they will come to give her an injection or take her to the hospital. In this way “the button” gave them some measure of control and connection they would not have without it. One participant said if she pushes the button “somebody will come and rescue me.” For the participants in this study, a PERS is a convenient way of connecting to others. One participant said, “When you’re alone that’s your company.” The value of the unit as a companion or link to others is even more obvious. For a few participants, routine testing of the unit was the only reason to use it in a non-emergency.

There was another non-emergency instance where the button was used. According to some participants, there are times when the PERS is used accidentally. A few said the button was "accidentally" activated due to the device’s sensitivity to touch. For a few participants, it was an opportunity to see how the unit was functioning. As one participant said, “You know you try and see if it works.” Another participant reported that she accidentally pushed it while cleaning it. While the inclusion of accidental use is included in this theme is not to suggest that such use is not purely accidental, but rather than even accidental use was experienced as reassuring and a reminder of the connection the PERS provides them.

The PERS program is also relational in that it was recommended by family or members of the healthcare system which are important to the participants- that is to say, it is symbolic of family and professional relationships. The PERS is both a device and a program. One participant said, “I haven’t used it, but they call when the nurse comes and speak to them or sometime they call and ask how I am doing, if I’m okay. Sometimes they call me to see if everything is alright and I like that a lot, you know. It made me feel like somebody cares. They say; “Is everything alright?” And I say, “Yes.”As suggested in theme one, reassuring presence, the relevance of participating in the program, provides connection to others that is accompanied with feelings of

increased security, despite having some degree of functional impairment and inability to otherwise be connected with their community. It is part of their connection with the medical caregivers and emergency helpers. Despite these benefits, most participants stated they do not wear the button all the time, and some did not use (press) the button as in after a fall at home.

Table 3. Themes and Examples of Key Comments

Theme	Examples of Key Comments
Reassuring presence	“It’s a good thing to have.” “It’s helpful if you wear it.” “I don’t have to worry if anything happens to me.” “It’s the only thing I have to call somebody in an emergency.” “I am glad to know at least someone is there.” “It’s a blessing.”
Simple and effortless, if you need it	“You just put it around your neck.” “It’s simple to use, and I need it.” “It’s the fastest way of getting help, if you wear it.” “Once you have it on it was not hard to use.” “Knowing that I have it on during an accident is simple enough.”
Alone but connected	“When you’re alone that’s your company.” “You know, you try and see if it works. Just in case.” “Sometimes they call me to see if everything is alright.” “If I push the button, somebody will come and rescue me.” “Even if you accidentally push it, someone will call you.” “When I push it, I can get people to call me, and they will come.”

In summary the three themes of *Reassuring presence*; *Simple and effortless, if you need it*; and *Alone but connected*, answered the research question: “What is the meaning of a PERS use for functionally impaired older adults?” (see Table 3. Themes and Examples of Key Comments). Therefore, an overarching theme is that a PERS may be an adjunctive resource—a helpful backup that promotes interconnectedness during an emergency at home. These themes provide the structure of the meaning of participating in the PERS program and having a PERS device, for these 14 participants choosing to age in place, with the adoption of assistive home-

based technology designed with older adults in mind. The process of content analysis is discussed next.

Content Analysis of Objectives

The purpose of doing a content analysis of the study was to uncover the meaning of the participants' responses and experiences from their perspective of using a PERS. The primary sources of data were collected from the 14 participants' chronicled life stories of using a PERS, and were based on the research question, "What is the meaning of a PERS use for functionally impaired older adults?" To account for this interactive process, Wolcott's (1994) four strategies for analyzing qualitative data was the best choice based on the study's design. The four strategies include: 1. Highlight certain information in description; 2. Identify pattern regularities; 3. Contextualize with the framework from the literature; and 4. Display findings in tables, charts, diagrams, figures, compare cases, and compare with standard case.

1. Highlight certain information in description - The data collected for this study included the participants' audio-taped responses, coded personal information, observations, and field notes. The written transcriptions were re-read, the audiotapes replayed, the participants' responses were compared for similarities and differences of their perceptions with using a PERS, and reliance on the researcher's field notes and comments. Specific comments were excerpted (highlighted) and represented as close to the participants' original responses to maintain the integrity of the transcripts.

2. Identify pattern regularities - The patterns of the participants' responses were grouped to uncover themes, as evidenced by their individual stories of using a PERS while aging in place. In some cases, the participants' responses were repeated to reflect the context of the objectives,

to identify patterns, and analyze themes within the context of the TAM model, as it specifically relates to technology use among these older adults.

3. Contextualize with the framework from the literature - This phase of analysis revealed the meaning of PERS use from these participants perspectives, with the assumption that the data spoke for itself. The framework which guided this study was the TAM and the three theories which supports it: Theory of Reasoned Action (Fishbein & Ajzen, 1975); Theory of Planned Behavior (Ajzen, 1985); and Theory of Self- Efficacy (Bandura, 1977), providing structural meaning in relation to the study's findings. Examples of participants' descriptions were supported as evidenced by the study's findings and their relevance to the literature.

4. Display findings in tables, charts, diagrams, figures, compare cases, compare with standard case - Findings of the data included the Interview Guide (Table 1), Participants' Demographics (Table 2) and Table3, Themes and Examples of Key Comments. Diagrams included the three TAM models (see Appendix. A). Figures included the PERS devices (see Appendix B). Comparison cases were exemplified throughout the study based on the literature review, and compared with the study's findings to support their relevance to nursing, education, practice and research. In conclusion, content analysis was an essential part of this exploratory-descriptive study.

Summary

This chapter addressed the participants' demographics that were obtained from the participants and coded personal information from the Director of the VNSNY CHOICE program in Section one. This information was presented as a demographic table. The participants' stories were addressed in chronological order and the lengths varied depending on the amount of information shared. Section two discussed the five constructs of the TAM which were analyzed

as objectives according to the model and the participants' unemployment status. Section three addressed the three themes that emerged from the exploration of the participants' responses as they were analyzed and represented in a tabled summary. Content analysis of the objectives were further analyzed based on Wolcott's (1994) four strategies for analyzing qualitative data to show its relevance to data collection and its exploration. The findings are discussed in Chapter 5.

Chapter 5

DISCUSSION OF THE FINDINGS

The findings of this exploratory-descriptive research study supports the answer to the research question, “What is the meaning of a PERS use for functionally impaired older adults?” For the purpose of this study, *use* of a PERS referred to the subscription of the VNSNY PERS unit. For each of these 14 participants, their answer lies in pressing the help-button on their neck pendant or wrist-style PERS: A reassuring presence, that is simple and effortless, if you need it, and, when alone, may still feel alone but connected. The findings suggest that these participants enjoy a satisfactory quality of life, in part because of the freedom and independence the PERS unit affords those that accept and use it. In other words, for these participants, PERS does not have to be used to have impact.

Another significant finding for this study is the methodological gap in the literature that relates to what “use” actually represents. For these participants, use meant having to “press” the help-button which was nearby, during an emergency. For example, easy reach, or accessibility of the PERS pendant or wrist device (on the bed, nightstand, table) was more important than wearing it, as the author referenced in Porter and Ganong’s (2002) phenomenological study that explored the experience of eight frail women aging in place and having a PERS. A more recent study was conducted in Canada on how community-dwelling older adults purchase and use PERS (McKenna, Kloseck, & Polgar, 2015). The findings show there was a reassurance of getting emergent help at home, which was a significant reason, response, and experience of living with the PERS device, also, the decision to press the button was associated to how serious the user perceived the emergent situation.

In terms of the issue of accidental activation of the PERS, some participants' expressed their annoyance towards unexpected startling noises from the responders - how they felt about being monitored. For some, a solution, though useless, was to decrease the targeted behavior of actual "use" of the neck pendant or wrist button. As Freimuth (2010) noted, annoyances such as constant communication with emergency responders and a decreased sense of safety with unexpected contact by the responders are perceived as bothersome, and may cause subscribers of the PERS to be indecisive about wearing the buttons at all times. The author offered a plausible solution, which is that PERS providers re-design the buttons to make them difficult to activate accidentally.

The findings also explored the TAM five objectives of usefulness, ease of use; intention to use, use, and barriers to use. The 14 participants' perceptions of the utility and ease of use of PERS, and its meaning as it relates to their lived experiences, were analyzed. Additionally, it is the researcher's belief that the findings of this exploratory-descriptive research satisfactorily supported the relevance of the three theoretical building blocks of the TAM which are Theory of Reasoned Action (Fishbein & Ajzen, 1975), Theory of Planned Behavior (Ajzen, 1985), and Theory of Self- Efficacy (Bandura, 1977).

The purpose of analyzing these three theories is to provide some structural meaning in relation to the study's findings, and based on technology use among older adults, using the TAM.

Theoretical Analyses

Theory of Reasoned Action (Fishbein, 1975)

1. Behavioral beliefs - A person's subjective probability that performing a certain behavior will produce a particular outcome. It is the researcher's viewpoint that these 14 participants utilized their free-will to participate in this research study (subjective probability of performing this behavior). Importantly, all participants were aware of the consent form's

significant benefit to participating in the study which is that their participation may increase general knowledge of what it means for older adults in Medicaid-managed day center settings to use a PERS. The researcher offered the opportunity to participate in the study, and to tell their story about using “the button” (a particularly favorable outcome). This study was the first of its kind conducted at this site, and the participants were eager to tell their stories. The reliability on the participants’ truth-telling could not be always confirmed by the researcher. However, the demographical data that was provided by the Center’s Director and coded by the researcher for the purpose of protecting the participants’ identity, along with the researcher’s direct observations, confirmed some of their shared information, such as years of PERS subscription.

2. Normative beliefs - An individual’s subjective probability that a particular referent (the researcher) wants the person to perform a certain behavior (tell their experiences of using a PERS). It is this researcher’s viewpoint that, from an ethical perspective, these 14 participants had the opportunity to opt out of the study at any point without feeling penalized, as outlined and discussed in the VNSNY IRB Consent Form for Research Study. A mutual and trusting researcher-participant relationship was developed at the beginning. The participants exhibited behaviors, such as ongoing eagerness to participate throughout the recruiting and screening phases of the study, were determinants of being potential participants.

Theory of Planned Behavior (Ajzen, 1985)

In addressing Ajzen’s (1985) theory, the study’s findings were supported by its three factors. The first factor, *a favorable or unfavorable evaluation of the behavior* (attitude toward the behavior) was prevalent throughout the study. All participants openly discussed their delight and enthusiasm with participating in the study in several positive ways before, during, and after the data collection period. For example, before the consent form was read to them, some verbally

expressed to their peers, staff, Director, and researcher that they were happy to “do research.” At the end of the interviews, some participants were encouraging their peers with PERS to talk to the Director and researcher about participating. During the recruitment phase, all participants thanked the researcher for the very much unexpected and unconditional monetary benefit of a \$10.00 gift-card. Before the interviews were audio-taped in the assigned Interview Room, all participants stated they were glad that they were able to talk to the researcher in private because “other people may hear their business.” The participants’ positive attitude towards participating in the study was relevant to this first factor. Overall, the findings of this study highlights the prediction of the Theory of Planned Behavior, as it relates to the participants’ intention to use home-based assistive technology, such as a PERS (Benbassat & Barki, 2007).

The second factor of Ajzen’s (1985) theory is *perceived social pressure to perform or not perform the behavior* (subjective norm). From a sample of 30, 16 subscribers did not participate in the study for several reasons. Some verbally declined because of illness; not using a PERS anymore; and visits with relatives and friends during the holiday season. For the 14 free-willed participants, as far as the VNSNY CHOICE Director and researcher are aware, no expressions of any perceived pressure to participate in the study were reported, as exemplified by the significant positive behaviors displayed in the first factor. Additionally, the researcher reminded each participant of the consent form’s clearly stated possible perceived minimal risks to participating in the study such as anxiety or embarrassment related to using a PERS, and the researcher’s ethical responsibility to minimize any discomfort. All participants verbally agreed to participate in the study, signed consent, and received a copy of the Consent Form for Research Study. Additionally, they were encouraged to discuss the consent form with anyone, and address any questions or concerns pertaining to the study with the researcher or the VNSNY CHOICE

Director at any time. No participant opted out at any time. It is the researcher's belief that by the participants perceiving no pressure to participate in this study, is a significant subjective factor.

Lastly, the third factor, *self-efficacy and its relation to the behavior* (perceived behavioral control), is addressed. These 14 participants made independent decisions to participate in the study at free-will. They knew why they were selected and of their options to discontinue participation at any time. Self-efficacy was exemplified as their ability to give consent to participate in the study, individually reviewing the consent form, and deciding to participate and complete the stud - a perception of behavior control.

Theory of Self-Efficacy (Bandura,1977)

The findings could also be discussed in terms of Bandura (1977) by understanding that self-efficacy involves the interplay of behavior, environment, and cognitive factors. Self-efficacy is defined as a judgment of one's ability to execute a particular behavior pattern (Bandura, 1977, p. 193). In reflecting on these 14 participants, their interplay of behaviors (eagerness to participate in the study; own a PERS; free-will to participate in research were displays of significant degrees of self-efficacy. No participant informed the VNSNY CHOICE Director or researcher that they would discuss the consent form with family or friends before making the decision to participate or not. Instead, they all gave verbal and written consent during the in-person screenings with the researcher at the site, and all received a copy of the consent form.

In terms of environmental factors, the 14 selected participants appeared to exhibit some level of comfort with a pre-determined process with the data collection procedures (a familiar place; privacy; assigned interview room; explanations of the audio-taped interview process and procedures; no unnecessary distractions; no interruption of scheduled activities; option to end interview at any time for any reason).

The researcher believed that some examples of positive cognitive factors related to the participants were also an inclusion criteria for the study, such as no history of cognitive disorders; ability to self-report; minimal risk to being in the study; and the overall benefit of contributing to research on PERS use among their age group. This was the first study of its kind conducted at this site. Overall, as Bandura (1977) analyzes, the inter-relatedness of behavior, environment, and cognitive factors, were positive, significant correlations to expectations of self-efficacy outcomes for these 14 participants. The findings of this study supports the theory of Self-Efficacy as it relates to technology use among older adults aging in place with the reassurance of some degree of safety and connectedness, particularly during emergent situations.

The PERS unit was the phenomenon of the study, a VNSNY CHOICE program, and a home-based AT device for 14 participants advancing in age and managing some form of functional impairment. VNSNY nurses reminds, and encourages, all subscribers of the PERS that they may activate the button during a physical, emotional or environmental emergency. Subscribing to a PERS has empowered some of these 14 participants to make proactive and timely decisions regarding their emergent care, while continuing to age in place longer with some degree of independence and safety, as they relate to their functional impairments

Technology Acceptance Model (TAM), (Davis, 1989)

The five constructs of the TAM were analyzed as objectives of the researcher-participant dialogue and inquiry of this exploratory-descriptive method as follow.

1. Usefulness- All participants verbalized a significant degree of belief that using the system (a personal emergency response system) will help them attain gains in job performance (using the system). By using the system (wearing; activating) the participant may achieve positive gains (benefits), such as emergent care at home during a medical or environmental

emergency at home. Overall, they believed the PERS is helpful if you wear it. Regardless of some positive and significant perceived gain to system use, a study conducted on the satisfaction and use of PERS among older adults who are aging in place, found that on average, despite the subscribers' awareness of the medical benefit of receiving timely emergency assistance, as with the incidence of a fall, they reported never wearing the help button (Heinbüchner, Hautzinger, Becker, & Pfeiffer, 2010).

2. Ease of Use - Significantly, all the participants believed that using a particular system (PERS) is free from effort (very easy to use). All the participants stated that a significant feature, and subsequent subscription to the PERS, was its ease of use when demonstrated by the visiting nurse at their home. Participants described their PERS as "very easy to use." For them, ease of use was the fastest way of getting help by just putting the PERS pendant device around your neck or wrist and just pressing it if anything happens to them at home. This finding is supported by a study conducted by Rodeschini (2011) among the inter-relatedness of older adults aging in place, using gerotechnology, and the context in which they use it. The study emphasized that there was a significant benefit to older adults' acceptance and use of technology, regardless of any physical problems, while achieving their desired goal to age in place independently (p.524).

3. Intention to Use - A significant finding is that in almost all instances, the participants made the decisions (subscribing to the PERS program and device), and formulated conscious plans to perform or not perform some specific future behavior (continuing to subscribe to the PERS; wearing the device; deciding whether to use it or not during an emergent situation; activating the neck or wrist push-button device). Despite these proactive decisions, almost all of the participants reported they did not wear or use "the button" as instructed. These findings are

also supported by other studies conducted on PERS as previously noted (Hessels, Le Prell, & Mann, 2011; Porter & Ganong, 2002; Sherwood & Morris, 1980).

4. Use -There was a significant agreement among these participants that the PERS unit was a good thing to have, and it was very helpful when the button was activated during an emergent situation (a positive feeling towards performing the target behavior). In a few instances when there was accidental activation, such as when cleaning the unit, some participants expressed negative feelings (unnecessary and unexpected noises, fright, increased hesitance to wear the device) toward performing the target behavior (actual “use” of the button). However, the participants also reported feeling a sense of security that it is very easy to use (press the button), it works, and the call center’s response was immediate. Though the sensitivity of the push button feature was seen as bothersome to some participants when accidentally activated, an earlier study by Mann, Belchior, Tomita, and Kemp (2005) showed that a significant number of participants expressed an enhanced feeling of security in terms of the helpfulness of their PERS.

5. Barriers to Use-Significantly, almost all participants stated that “nothing will prevent them from using the PERS.” Even though almost none of them reported that they wear the device on a regular basis, the presence of informal caregivers (family; friends) and formal caregivers (Home Health Aides) also influenced whether they wore the device or not, and if it will be activated during an emergency (obstacles that may prevent an individual from completing or continuing a specific task). The visiting nurses’ awareness of the relevance of PERS to subscribers, families/friends, home care aides, were promoted through community-based education. However, participants still did not wear or activate the push-button feature during falls at home. For example, Laurie stated an occasion when she fell at home and did not activate

the button because her daughter was there, and besides, she had no injury, so “there was no need to bother them.”

Despite any barriers or limitations to technology, some researchers believe that once appropriate training interventions are put in place, the relevance of technology, its services, and benefits, have been shown to be significant facilitators to using the device, while increasing the significance of its awareness (Morris, Goodman, & Brading, 2007). As Venkatesh (2003) noted, older adults are likely to accept and use technology if it meets their needs and expectations.

The study findings provide some insight into the meaning of technology for these 14 participants who chose to age in place. Rather than being dehumanizing, appropriate and simple technology can help older adults remain relatively independent, continue to live where they choose and engage in activities they find meaningful without undue apprehension. Active engagement in community-based activities is promoted and supported by the VNSNY CHOICE MLTC Plan. For example, the VNSNY CHOICE MLTC Member Handbook lists benefits such as Adult Day Health Care and Social Day Care, which are structured programs that provide caregiver assistance to and from the site, transportation, socialization, and leisure time activities (VNSNY, 2014).

These are significant interventions for avoiding or decreasing long term care institutional placement, decreasing the likelihood of being homebound, and increasing independence while aging in place. This study’s 14 participants reported that they are actively engaged in their communities, and also at the site with their participation of scheduled activities, as observed by the researcher.

Implications of The Study

The findings of this study suggest that PERS do help older adults remain active and avoid institutional placement. The research question asked: What is the meaning of a PERS use for functionally impaired older adults? For these 14 participants it is a reassuring presence that is simple and effortless, if you need it, and when alone, still feel alone but connected. The findings also show the value and limitations of simple and appropriate technology use in later life. The findings reveal that older adults use technology to remain connected and that it provides some degree of reassurance to older adults and their caregivers, both formal and informal. As in the pilot interviews, some older adults reported that the impetus for subscribing to a PERS was after an emergent situation with a family or friend, as with Mr. C.R.

The findings do provide some correction to the exaggerated promises some vendors and advertisers make regarding home-based assistive technology and its effect on educating older adults. For example, the younger “baby boomer” who may not have a functional limitation may also wish to purchase a traditional PERS, “just in case something happens.” Conversely, the findings also has implications for older baby boomers.

Baby boomers, as younger cohorts age, will change their relationship to technology. In other words, people who are 79 in 20 years will have a different relationship to technology than people who are 79 today, therefore raising the issue of aging and the cohort effect. An aging effect relates to a group of people being born approximately the same time, exposed to the same societal events, and predisposed by the same demographic trends, making them unique because of their characteristically similar experiences (Cozby, 2009). In terms of a cohort effect, it is a change which characterizes populations born at a specific moment in time, and is independent of the aging process (Cozby, 2009). However, as Cozby (2009) hypothesizes, cohort effects are

most likely to be problematic for cross-sectional studies primarily because of the difficulty with separating effects of developmental changes from cohort effects when examining age effects across a wide range of ages.

In terms of functional status, theory and evidence support accessible services for older adults that will promote and maintain maximum health, functioning, independence, and ultimately avoiding the possibility of long-term placement (VNSNY, 2014). An emerging theory, The Paradox of Aging (Hall, 2010), has been revolutionizing traditional thinking about aging and cognition; it states that as people age, their emotional wellbeing improves. Overall, this theory suggests that positive emotions have supportive health benefits as one ages, and the overall effect in later life may be a gradual delay in the rate of functional strength.

Globally, nurses are major stakeholders in conducting studies, as in China, where long-term issues related to older adults' expectations regarding aging, functional health status and physical activity are researched (Li, Lv, Li, Zhang, Li, & Jin, 2013). Globally, developing countries are aging at a much faster rate than developed countries, and statistics show that by 2050, 79% of the world's older people will be living in those countries (World Economic and Social Survey 2007: development in an ageing world. New York: UNDESA; 2007).

Within the past decade, some organizations and government agencies have promoted and encouraged an increase for the development of more *age-friendly* social and physical environments that will promote the health of older adults, their well being, and an optimal ability to age in place (United Nations Department of Economic and Social Affairs. Population Aging, 2006). Age-friendly environments (social and physical) are those that offer infrastructure and supports that meet the needs of older adults and allow them to remain involved in community life as they age in place (Alley, Liebig, Pynoos, Benerjee, & Choi, 2007). Most importantly, WHO

clearly acknowledge that active aging is a life-long process and that people of all ages vary in their functional (emotional, physical) capacity in an “age-friendly city.”

Physical activity is an important action related to healthy aging (King & King, 2010, p. 405). This study does suggest that assistive technology can be helpful toward this goal. Nursing care professionals, such as the visiting nurses in this study, were pivotal in the introduction, referral, subscription and instruction of home-based assistive technology through the VNSNY PERS program and device, as stated by all 14 participants.

Relevance of The Study

This was the first study of its kind conducted at a VNSNY CHOICE site. Overall, most of the researcher’s assumptions and biases were relevant to this study, and some were strengthened by the findings. This study’s impact on the older adult’s ability and choice to age in place despite functional impairments, are evidenced by these 14 participants who identified, and held in high regard, their relationship with their visiting nurse who introduced them to the program and device.

Aging in place has become a central concept in the scholarly field of gerontology, and numerous scholarly institutions and think tanks are drawing awareness to aging concerns (The John A. Hartford Foundation, 2015; Vasunilashorn, Steinman, Liebig, & Pynoos, 2012; VNSNY, 2013). From a global aging perspective, Asian, Native Hawaiian, and other Pacific Islander population will show the largest increases in the proportion of older adults, and Hispanics over 65 will continue to be a relatively young population by 2050 (Ortman, Velkoff, & Hogan: *An Aging Nation: The Older Population in the United States. Current Population Reports*. Washington, DC: U.S. Census Bureau, 2014).

In conclusion, this study was designed to provide greater understanding of the impact of PERS use on the older adult choosing to age in place despite a functional impairment. The TAM aided the researcher in exploring the three objectives of usefulness, ease of use, and use, of a PERS.

Generality

This study's design does not allow for generalization beyond the participants. This was the first study of its kind conducted at a VNSNY CHOICE site. It does suggest some generalities for similar community-dwelling urban minority older adults with similar technology. The exploratory-descriptive approach allowed the participants opportunity to answer open-ended questions in a nonjudgmental interview. Due to the participants' numerous chronic health problems and different degrees of functional impairment, this program (VNSNY CHOICE) and device (PERS) benefitted them by helping them remain in their preferred living situation. The TAM model provided an appropriate structure for the objectives, questions, and emergent themes. For example, the participants' perceived usefulness (simple to use) of the PERS unit significantly enhanced their PERS use (performance). In terms of the second construct, perceived ease-of-use, the technology was for the most part, effortless to use. The participants' intentions to perform a given behavior (continue to use PERS) were influenced by their favorable attitude toward it, with or without social pressure placed on them to do so. Lastly, these participant's comments suggest that they are able to maintain a fairly solid level of self-efficacy, while respecting their chronic illnesses and declining levels of functioning.

Limitations

Equally important to note is the study's limitations in relation to the findings. This exploratory-descriptive research study was designed to maximize the participants' voluntary

participation. However, the male sample size (1 out of 14) was a major limitation to the study. Although this is understandable, it needs to be considered in interpreting the findings. None of the participants were observed by the researcher to be wearing either the neck or wrist device during the interview. This was a major limitation to the study because almost all participants reported that they do not wear their PERS in the community because it is designed to wear in the home, whereas a few stated that they didn't want people to see them wearing the device for fear that they may ask them about it. However, one participant, Manny, wore his neck pendant on a subsequent center visit and showed it to the researcher. Noteworthy also, is that Angela was interested in a PERS that could be activated outside the home and the researcher referred her to the coordinator for further discussion after the interview. Another limitation was that cost was not a barrier to subscribing to the VNSNY PERS because the participants were Medicaid eligible to receive the free device. Also the participants were primarily Black women of American and West Indian/Caribbean ethnicity all living in New York City. There were also limited content on the PERS related to the two TAM constructs of Intention to Use and Barriers to Use, so a follow-up study is needed to better explore these two constructs of the model. The participants' limited education attainment and age-related unrecognized mild cognitive decline may have kept their ability to express their experience well. It is important to examine individual differences, namely external variables, since they are the ultimate drivers for the use of technology (Legris *et al.*, 2003).

Suggestions for Future Research

The findings of this study contribute to the literature on use of technology in later life and identifies some important questions for future research on home-based AT devices and its use among this population. For example, future research on the methodological gap in the literature

that relates to what “use” and “non-use” of PERS actually represents. Future studies are also needed in a community setting where PERS are designed to be worn outside the home. Rowe (2010) offered a positive suggestion for future research on implementing various healthcare-related interventions for older adults by concluding that academics, practitioners, and other stakeholders will have to continue implementing various interventions related to health and other services that may improve health and quality of life overall. Nursing education and continuing education should include realistic information regarding technology, to thereby assist nurses to not be unduly influenced by direct marketing claims. Overall, this study’s findings may contribute to nursing, education, practice, and research

Nursing- From a nursing perspective, this study is relevant because it is the first VNSNY approved study to be conducted among subscribers of their VNSNY CHOICE program and their cost-effective PERS device, by a doctoral nursing student. VNSNY continues to be a major stakeholder in the care of older adults and providing cost-effective care in community settings. As suggested by Brown Wilson (2009), community health nurses and practitioners must maximize their practice capacity, by doing so, they build relationships based on mutual trust, understanding, and a sharing of collective knowledge. For example, VNSNY publication, *Advantage Initiative-Helping Communities Develop Strategies for Aging in Place*, shares results of their surveys conducted among consumers 65 years of age and older, regarding their experiences and perceptions of aging in place, as an educational resource, particularly for community-based healthcare professionals.

Education- This study’s sample leads a very physically active lifestyle as evidenced by their interview responses. The researcher validated these self-reports through observation of some of their participation in the center’s scheduled physical activities. A study conducted by

Haley & Andel (2010) concluded that older adults who have a higher level of education inclined to have a wider knowledge base regarding the benefits of physical activity and are inspired to perform more physical activity. Education was not a variable available for this research study. Therefore, future research may be conducted to determine if there are correlations between level of education, physical activity, and PERS use among older adults. Also, inclusion of participants' education level and health literacy should be variables considered in future studies. Nurse educators, particularly community health nurses, should assure that nursing students are competent in caring for older adults and confident with participating in community-based pilot studies. As with this study, VNSNY supports transparency in their research through educational strategies for the older adult.

Practice- The inclusion of more male participants and diverse community-based settings deserve further study. A larger male sample size would have allowed for exploration of potential demographic variables, such as health determinants, which may be mitigated by home-based assistive gerotechnology. An earlier study has shown that it is important to examine individual differences (external variables), since they are the ultimate drivers for the use of technology (Legris *et al.*, 2003). In promoting best practices in nursing excellence in gerontology, VNSNY collaborates with The John A. Hartford Foundation, another major stakeholder in the area of gerontology research and education, to meet the demographic imperatives of the new millennium.

Research- PERS neck and wrist devices, the type of home-based assistive gerotechnology used by these 14 participants, were designed with functionality in mind-easy to wear and easy to use by older adults. Despite these end-user benefits, most participants in this study still did not wear or use the "button" as needed. Through technologic advances, these basic devices are now

being replaced by multi-use, more interactive, devices, such as a wrist worn computer, which may be more challenging for the older adult facing challenges with the digital divide. However, as with the introduction of any new technology, longitudinal studies will need to be conducted on user compliance. As the “baby boomer” population grows, gerotechnologies are projected to include “artificial friends.” According to a recent article in The New York Times: “Artificial Friends for the Aging” (Markoff, 2015), the author highlighted that within the next decade, some home-based virtual and robotic technologies for the aging will include intelligent walkers, smart pendants, and virtual and robotic companions. Gerotechnological collaborations with companies such as VNSNY, contribute to devising the right kinds of products for older adults aging in place, and educates family and friends (who may also be older boomers) and professional caregivers, on the use of the home-based assistive technologies to promote or maintain some degree of independence in activities of daily living. This century is now faced with a younger population that is now on the forefront of avid technology use.

New Technology, New Users- A new generation called Millennial, born between 1983-2001, and may also be children of baby boomers. The Pew Research Center (2014), conducted a telephone survey among 1,821 adults between the ages 18-33 and identified this population as “digital natives.” The study added that Millennials are the only generation for which new technologies are not something they’ve had to adapt to, and have contributed significantly to a recent narrowing of the digital divide.

Summary

The findings of this exploratory-descriptive analysis discovered three themes: Reassuring presence, Simple and effortless, if you need it, and Alone but connected, provide the structure of the lived experience of using the PERS unit while aging in place. The findings show a significant correlation between the TAM (1989) constructs of *use* and *ease of use* which seems to help

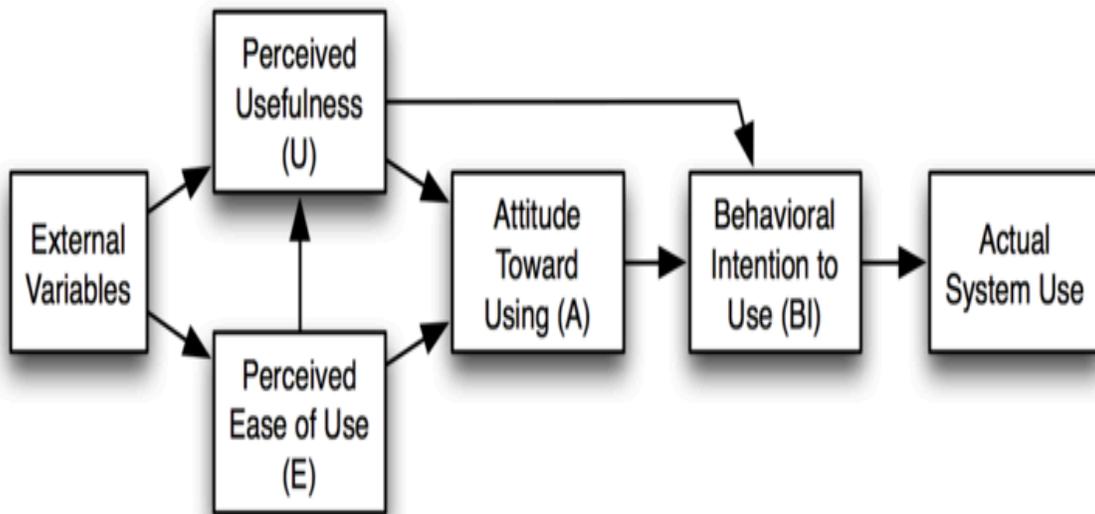
maintain the self-efficacy of older adult inner city Blacks choosing to age in place. The research question was asked: “What is the meaning of a PERS use for functionally impaired older adults?” and was answered. The TAM is seen as generally remaining relevant to research with older adults and technology.

While the current fascination with the newest technology is not supported in this study, technology is not seen as dehumanizing and isolating as some commentators suggest. Research suggests that newer technologies designs are needed. Research findings will show whether these devices are user-friendly, and whether they are used as intended. VNSNY continues to support aging in place and encourages nurses to participate in community-based research among this population to thereby transfer research into best practice. Millennials are the next generation of technology users to advance the digital era.

APPENDICES

Appendix A. Diagrams

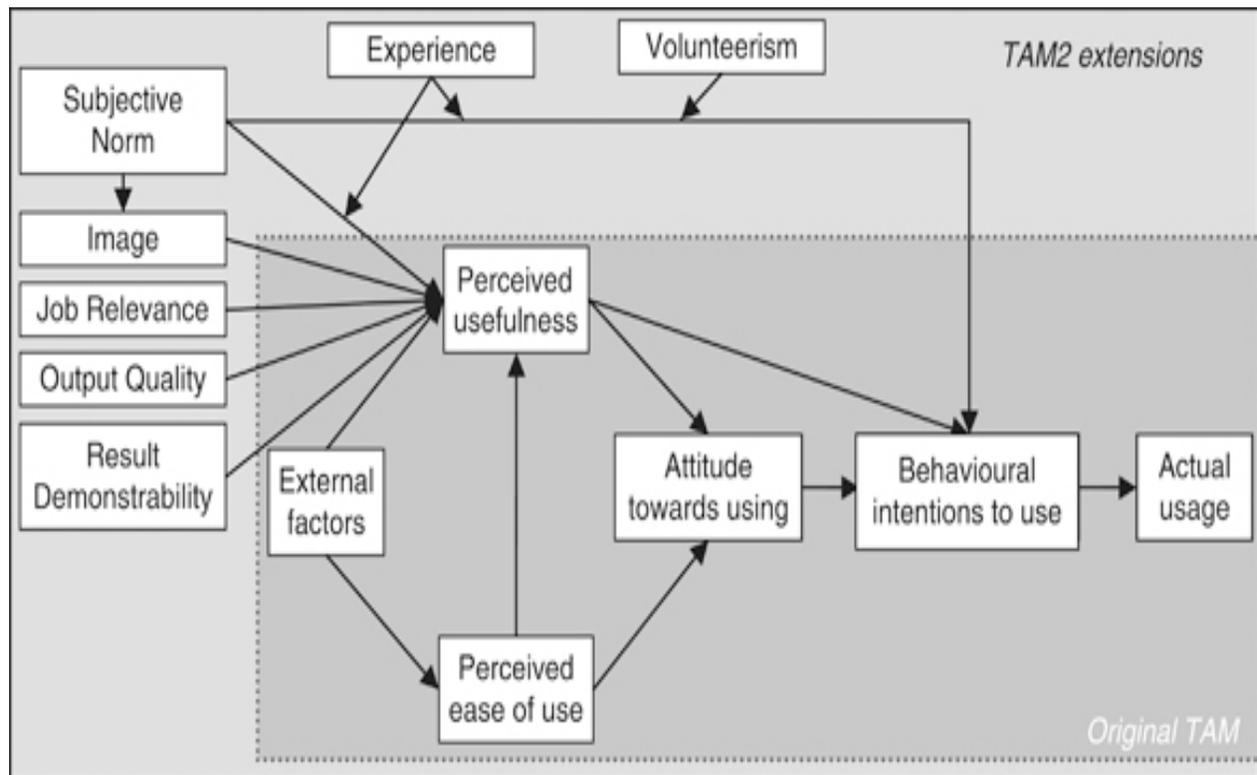
Diagram 1. TAM Model (1989)



Source: *The Technology Acceptance Model, version I.* (Davis, 1989©).

Appendix A.2

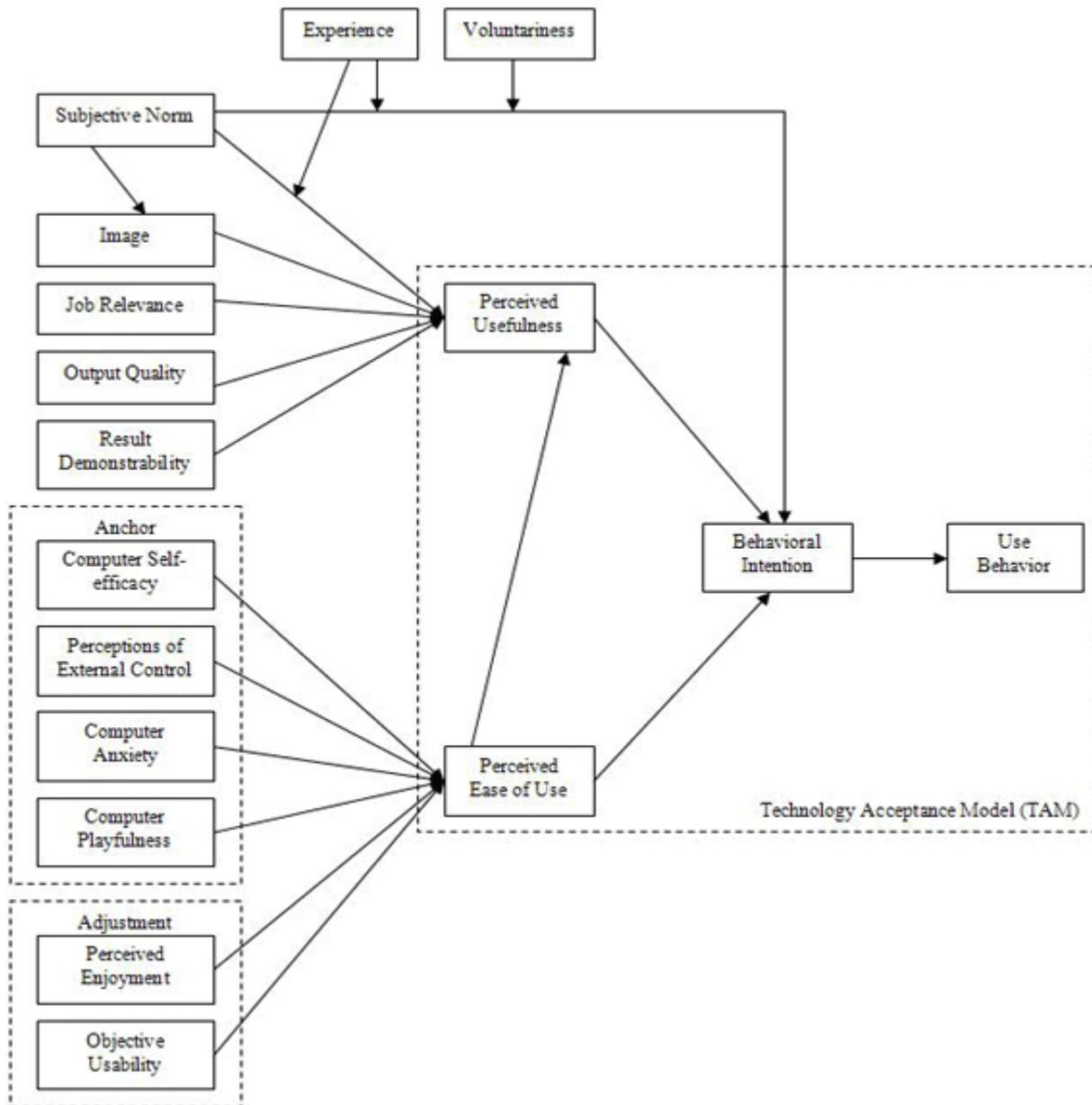
Diagram 2. TAM Model 2 (2000)



Source: *The Technology Acceptance Model2* (Venkatesh & Davis, 2000©)

Appendix A.3

Diagram 3. TAM Model 3 (2008)



Source: *The Technology Acceptance Model3* (Venkatesh & Bala, 2008©).

Appendix B

Figure 1. Philips Lifeline pendant and wrist-style PERS and communicator systems



A subscriber of Philips Lifeline pendant-style PERS. (Philips Lifeline, 2014)

Source: *Lifeline Systems, 2014*©.

Appendix C

1250 Broadway, New York, NY 10001, 212.609.5687

Claudia.Beck@vnsny.org



Claudia A. Beck, PhD, ANP-BC
Director, Clinical Operations & Support Services

June 16, 2014

Susan Regan, IRB Chair

Visiting Nurse Service of New York

[Redacted]

Dear Members of VNSNY Institutional Review Board,

As the Director of Clinical Operations and Support Services, I am writing to provide administrative approval for the study entitled "Exploring older adults' perceptions of the utility and ease of use of personal emergency response systems."

This study aims to explore older adults' perceptions of the utility and ease of use of personal emergency response systems (PERS). This research will assist in identifying the perceptions of older adults about the PERS unit, as well as the meaning of PERS use for them as they age at home.

I have reviewed the research protocol with Patricia McLean, a Ph.D candidate in Nursing at the Graduate Center, CUNY, and hereby grant approval for her study to conduct said research at VNSNY CHOICE. Please free to contact me if you have any questions or concerns at [Redacted]

Sincerely,

[Redacted Signature]

Claudia A. Beck, PhD, ANP-BC

Appendix D

<u>CUNY UI - Institutional Review Board</u>
<u>Approval Date: December 02, 2014</u>
<u>Expiration Date: December 01, 2015</u>
<u>Coordinator Initials: SL</u>

	Approved on:	11/27/2014
	Expires on:	10/29/2015
Visiting Nurse Service of NY Institutional Review Board (IRB) FWA#00001885	Study number:	E14-004

Consent Form for Research Study

Exploring older adults' perceptions of the utility and ease of use of personal emergency response systems.

Subject: _____
Research Project No.: _____

WHY ARE YOU DOING THIS STUDY?

You are invited to participate in a study about what it means for an adult 65 and older to use a personal emergency response system (PERS). The investigator hopes to gain a better understanding of the meaning of PERSs use from the perspective of older adults' in a Medicaid-managed day center setting, and to spread the findings of the research study among healthcare providers of older adults who are aging in place.

You were selected as a possible participant in this research study because you meet the eligibility requirements based on your membership in the VNSNY CHOICE Managed Long Term Care (MLTC) program.

WHAT HAPPENS IF I SAY YES, I WANT TO BE IN THIS STUDY?

If you decide to participate, the Principal Researcher, Patricia A. McLean, DNS(c), will schedule an in-person screening interview with you at your CHOICE Adult Day Center at a day and time convenient for you. The Principal Researcher expects the initial time of subject participation to be approximately thirty minutes, but no longer than one hour, and will include the discussion of the nature of the research study and all consents. You will be given a consent to sign for the use of your audio-recorded responses. Additional interviews may be needed to review your consented audio-taped responses.

ARE THERE ANY RISKS TO BEING IN THE STUDY?

Your participation in the project may involve a minimal risk because every research study has the potential for possible risks that are not greater than those ordinarily encountered in daily life. Your participation in this research study may involve some discomforts such as stress related anxiety or embarrassments as you recall your personal experiences with using a PERS. If at any time you experience any discomfort as a result of this research study, you may notify the Principal Researcher so that the discomforts could be minimized by referring you to the appropriate resources at VNSNY CHOICE Managed Long Term Care.

ARE THERE ANY BENEFITS TO BEING IN THE STUDY?

There are no reasonably direct benefits guaranteed for participating. However, your participation in this research study may increase general knowledge of what it means for older adults in Medicaid- managed day center settings to use a PERS. There are no direct costs for your participation in this research study. You will receive a \$10.00 gift card for a neighborhood business after your initial in-person interview with the Principal Researcher.

Appendix E. 1



DATE: November 3, 2014

TO: PATRICIA ANN MCLEAN, AAS,BSN,MSN
FROM: Visiting Nurse Service of New York Institutional Review Board (IRB)

STUDY TITLE: [559862-2] Exploring older adults' perceptions of the utility and ease of use of personal emergency response systems.

IRB REFERENCE #: E14-004
SUBMISSION TYPE: Amendment/Modification

ACTION: APPROVED
APPROVAL DATE: October 30, 2014
EXPIRATION DATE: October 29, 2015
REVIEW TYPE: Expedited Review

REVIEW CATEGORY: Minimal Risk

Thank you for your submission of Amendment/Modification materials for this research study. Visiting Nurse Service of New York Institutional Review Board (IRB) has APPROVED your submission. This approval is based on an appropriate risk/benefit ratio and a study design wherein the risks have been minimized. All research must be conducted in accordance with this approved submission.

This submission has received Expedited Review based on the applicable federal regulation.

Please remember that informed consent is a process beginning with a description of the study and insurance of participant understanding followed by a signed consent form. Informed consent must continue throughout the study via a dialogue between the researcher and research participant. Federal regulations require each participant receive a copy of the signed consent document.

Please note that any revision to previously approved materials must be approved by this office prior to initiation. Please use the appropriate revision forms for this procedure.

All SERIOUS and UNEXPECTED adverse events must be reported to this office. Please use the appropriate adverse event forms for this procedure. All FDA and sponsor reporting requirements should also be followed.

Please report all NON-COMPLIANCE issues or COMPLAINTS regarding this study to this office.

Please note that all research records must be retained for a minimum of three years.

Based on the risks, this project requires Continuing Review by this office on an annual basis. Please use the appropriate renewal forms for this procedure.

If you have any questions, please contact Lori King at (212) [REDACTED] or [REDACTED]. Please include your study title and reference number in all correspondence with this office.

Appendix E. 1 (continued)

For the Institutional Review Board,



Susan Regan, IRB Chair

Appendix E. 2



Human Research Protections Program

Hunter College (CUNY) HRPP Office

DATE: December 3, 2014

TO: PATRICIA ANN MCLEAN, AAS,BSN,MSN
FROM: Hunter College (CUNY) HRPP Office

PROJECT TITLE: [559870-4] Exploring older adults' perceptions of the utility and ease of use of personal emergency response systems.

SUBMISSION TYPE: Response/Follow-Up to New Project

ACTION: APPROVED

APPROVAL DATE: December 3, 2014

EXPIRATION DATE: December 2, 2015

RISK LEVEL: Minimal Risk

REVIEW TYPE: Expedited Review

REVIEW CATEGORY: Expedited review category # 6,7

Thank you for your submission of Response/Follow-Up materials for this project. The University Integrated IRB has APPROVED your research. This approval is based on an appropriate risk/benefit ratio and a project design wherein the risks have been minimized. All research must be conducted in accordance with this approved submission.

Please remember that informed consent is a process beginning with a description of the project and assurance of the participant's understanding, followed by a signed consent form(s). Informed consent must continue throughout the project via a dialogue between the researcher and research participant. Federal regulations require that each participant receives a copy of the consent document.

Please note that any modifications/changes to the approved materials must be **approved by this IRB prior to implementation**. Please use the appropriate modification submission form for this request.

All **UNANTICIPATED PROBLEMS (UPS)** involving risks to subjects or others, **NON-COMPLIANCE** issues, and **SUBJECT COMPLAINTS** must be reported promptly to this office. All sponsor reporting requirements must also be followed. Please use the appropriate submission form for this report.

This research **must receive continuing review and final IRB approval** before the expiration date of December 2, 2015. Your documentation for continuing review must be received with sufficient time for the IRB to conduct its review and obtain final IRB approval by that expiration date. Please use the appropriate continuation submission forms for this procedure. PLEASE NOTE: The regulations do **not** allow for any grace period or extension of approvals.

If you have any questions, please contact Sarah Leon at (212) [REDACTED] or [REDACTED]@du.edu. Please include your project title and reference number in all correspondence with this committee.

Appendix F.

61-10 Queens Boulevard - Woodside, NY 11377 • 718.397.2000



October 17th, 2014

Dear Members of VNSNY Institutional Review Board,

As the Director of the VNSNY CHOICE Adult Day Center, I am writing to provide administrative approval for the study entitled "Exploring older adults' perceptions of the utility and ease of use of personal emergency response systems."

This study aims to explore older adults' perceptions of the utility and ease of use of Personal Emergency Response Systems (PERS). This research will assist in identifying the perceptions of older adults about the PERS unit, as well as the meaning of PERS use for them as they age at home.

I have reviewed the research protocol with Patricia McLean, a Ph.D candidate in Nursing at the Graduate Center, CUNY, and hereby grant approval for her study to conduct said research at the VNSNY CHOICE Adult Day Center.

Please free to contact me if you have any questions or concerns at 718- [REDACTED]

Sincerely,

[REDACTED]

David E. Smith, LCSW, CCM
Director- VNSNY CHOICE Adult Day Center

VNSNY CHOICE ADULT DAY CENTER

Appendix G

Visiting Nurse Service of New York - Institutional Review Board Conflict of Interest Disclosure Form

The Visiting Nurse Service of New York (VNSNY) Institutional Review Board (IRB) requires each principal investigator, co-investigator, or other individual who is responsible for the design, conduct, or reporting of funded research (all are referred to below as “Investigators”) to disclose actual and potential Conflicts of Interest* between his or her direct or indirect financial involvements and the research proposed in his or her IRB application. *Copies of the regulations and policies detailing these requirements are available from the Visiting Nurse Service of New York IRB.*

Each Investigator identified in a grant application must disclose to VNSNY any Reportable Economic Interest (i) that would be affected by or reasonably appear to be affected by the research for which the funding is sought, or (ii) in or from entities whose financial interests would reasonably appear to be affected by the research. Thinking about whether this applies to you is a *two-step process*:

First, determine if any of the Investigators have a Reportable Economic Interest which will, might potentially, or might appear to benefit the Investigator, the Investigator’s immediate family members or domestic household members, or any other person or entity with whom the Investigator has a shared economic interest.

Second, if the Investigator has identified a Reportable Economic Interest he or she should explain what steps may be taken or have been taken to eliminate any influence that Interest may have, or may appear to have, on the proposed research.

The VNSNY IRB will review Investigator disclosures and make a judgment as to whether a problematic conflict exists. If it does, the IRB will to the extent possible take steps to manage or reduce the Conflict of Interest; The VNSNY IRB will also require the Investigator to disclose any Conflict of Interest to the research participants, in the consent form or in other study details provided to the participant.

The key to handling these conflicts is full disclosure of the conflicting situation, to identify it, and allow the situation to be monitored and/or managed and/or eliminated. The VNSNY IRB is committed to moving research forward while maintaining objectivity and integrity. Only in cases where management of the Conflict of Interest is not reasonably possible will the conflict cause disapproval of the application.

The PI must ensure that all key personnel (all those responsible for the design, conduct or reporting of the research) complete this form and must submit all forms along with the PI’s IRB application to the Visiting Nurse Service of New York IRB. Key personnel must report to Visiting Nurse Service of New York IRB, any new Reportable Economic Interests acquired during the period of the study.

*** Please complete the form on the next page and return it to Visiting Nurse Service of New York Institutional Review Board along with the relevant VNSNY IRB application.***

*Capitalized terms are defined in the attached page entitled “Definitions Used in this Document.”

Edited: 08/25/10

Sources and Language taken from Partners PHS/NSF/AHA; OPRR guidance information; OHSU; DHHS regulations 45 CFR part 46, 21 CFR parts 50, 56

**Visiting Nurse Service of New York Institutional Review Board
Conflict of Interest Disclosure Form**

Investigator Name: David Smith
(Please Print)

Title of Study Application: Exploring older adults' perceptions of the utility and ease of use of personal emergency response systems.

PLEASE READ THE CRITERIA AND FOLLOW APPROPRIATELY:

DO YOU, ANY OF YOUR IMMEDIATE FAMILY MEMBERS, ANY MEMBERS OF YOUR DOMESTIC HOUSEHOLD, OR ANY OTHER PERSON OR ENTITY WITH WHICH YOU HAVE A SHARED ECONOMIC INTEREST, have any Reportable Economic Interest (i) that would or would reasonably appear to be affected by the research for which the funding is sought, or (ii) in any Financially Interested Business which would or would reasonably appear to be affected by the proposed research?

IF YOUR ANSWER IS NO, please check here and sign the form below and return.

IF YOU ANSWERED YES, please describe the Reportable Economic Interest:

Does it consist of Income? Describe the nature of the Business, employment, consultant, non-institutional royalty or other income:

Does it consist of Equity? Describe the Business, financial interests, including equity, options or other beneficial ownership:

Please briefly explain the connection between your proposed research and the Interest(s) you have listed above and what steps have been taken to mitigate any influence the Interest may have on the research. Use the back of the form or additional sheets, if needed.


Signed – Investigator

12/1/2014
Date

Edited: 08/25/10

Sources and Language taken from Partners PHS/NSF/AHA; OPRR guidance information; OHSU; DHHS regulations 45 CFR part 46, 21 CFR parts 50, 56

Definitions used in this document:

Reportable Economic Interest in Research: include the following interests of the Investigator, the Investigator's immediate family members, members of the Investigator's domestic household, and any individual or entity who shares economic interests with the Investigator:

- any speaking or consulting engagements, honoraria, gifts or in kind compensation from or on behalf of the research sponsor;
- board or other appointments for the sponsoring company whether paid or unpaid, whether advisory or not;
- patents, copyrights or trademarks, royalties, licenses, intellectual property or other interest related to the articles, compounds, devices, software, techniques, products, and the like under study in the protocol or that may be affected by the outcome of the study;
- financial, managerial or stock or other equity ownership interest (or entitlement to the same) in the sponsoring company or in the company producing the drug/device/biologic or other product under study or that has a component of the research;
- up front payments to the institution beyond those necessary for carrying out the research;
- compensation in the form of equipment;
- use of the sponsor's resources or assets in research;
- publication rights;
- recruitment bonuses; or
- finders fees or referral fees.

Exceptions: Reportable Economic Interests *do not include* the following:

- Interests of any amount in publicly traded, diversified mutual funds.
- Stock or stock options in a publicly-traded company that (when valued in reference to current public prices or using accepted valuation methods) meets the de minimis criteria established by the VNSNY IRB.
- Payments to the institution, or via the institution to the individual, that are directly related to reasonable costs incurred in the conduct of research as specified in the research agreement(s) between the sponsor and the institution.
- Salary and other payments for services from a sponsoring institution, including approved faculty practice plan earnings and the distribution of those earnings that may be established by departmental or other similar agreements provided that those agreements and departmental/divisional group plans are approved by the President/CEO.
- Income from seminars, lectures, or teaching engagements sponsored by public or nonprofit entities unaffiliated with the sponsor.
- Income from service on governmental and not for profit advisory bodies, (including scientific and technical groups) commissions, committees of professional associations related to the employee's work and consultations with persons in other governmental agencies or not for profit organizations on matters of mutual interest to the entity and VNSNY.

Edited: 08/25/10

Sources and Language taken from Partners PHS/NSF/AHA; OPRR guidance information; OHSU; DHHS regulations 45 CFR part 46, 21 CFR parts 50, 56

Financially Interested Business: means any business with financial interests that would reasonably appear to be affected by the conduct or outcome of any of the current or proposed research projects (including the sponsor of the research and/or the manufacturer, owner, assignee, or licensee of an investigational product or technology used in the research). This term includes businesses that compete with the sponsor or the manufacturer/licensee of an investigational product, if the covered individual actually knows that the financial interests of such a business would reasonably appear to be affected by the research. This term also includes any entity acting as the agent of a financially interested business (e.g., a contract research organization).

Business (noun, e.g., a business): Any corporation, partnership, sole proprietorship, limited liability company, limited liability partnership, firm, franchise, association, organization, holding company, joint stock company, receivership, business or real estate trust, or any other legal entity organized for profit or charitable purposes.

Conflict of Interest: A conflict of interest exists when an employee's financial interests or other obligations interfere, or appear to interfere, with the employee's obligations to act independently of undue influence and without improper bias. The mere appearance of a conflict may be as serious and potentially damaging to the public trust as an actual conflict. Therefore, potential conflicts must be disclosed, evaluated, and managed with the same thoroughness as actual conflicts.

Investigator: The principal investigator, co-investigator and other individual researcher or collaborator, including visiting scientists, responsible for the design, conduct or reporting of research or educational activities or responsible for preparing a proposal for research funding.

Edited: 08/25/10

Sources and Language taken from Partners PHS/NSF/AHA; OPRR guidance information; OHSU; DHHS regulations 45 CFR part 46, 21 CFR parts 50, 56

Appendix H.1 Script 1

In-Person Recruitment Script

Patricia A. McLean, RN, is a doctoral nursing student at the Graduate Center, City University of New York, and is the Principal Investigator conducting a research study about the use of personal emergency response systems among adults 65 and older. The purpose of this research study is to explore what usefulness and ease of use of personal emergency response systems mean for older adults who have chosen to live at home, despite a functional impairment. As a member of the Visiting Nurse Service of New York CHOICE Managed Care program, you have met the eligibility requirements for recruitment in this research study, and are considered a potential participant to be interviewed. With your permission, I would like to give her your name and telephone number so that she may contact you to discuss the details of the research study, and to set up an interview at the VNSNY CHOICE Adult Day Center at a day and time that is convenient for you.

If you have any questions regarding the research study, you may contact Mrs. McLean by email at: [REDACTED]. Or you may contact a person not involved with this research study at the Hunter College Human Research Protection Program (HRPP) at: [REDACTED]. I thank you for your time and consideration in participating in this research study.

Appendix H.2 Script 2

In-Person Screening Script

Hello, my name is Patricia A. McLean. I am a doctoral nursing student at the Graduate Center, City University of New York. As part of my studies among adults 65 and older, I am the Principal Investigator conducting a research study about the use of personal emergency response systems. The purpose of this research study is to explore what usefulness and ease of use of personal emergency response systems mean for older adults who have chosen to live at home, despite a functional impairment.

You will be asked a series of brief interview questions regarding your personal emergency response system that would take about 30 minutes but no more than 1 hour of your time to complete. Whether you decide to participate or not, at the end of your initial interview, you will receive from me a \$10.00 gift card enclosed in a numbered envelope without any of your identifying information, to use at a neighborhood business. If you have any questions later on, you may reach me by email at: [REDACTED]. Or, the Faculty Advisor, Dr. Steven Baumann, at [REDACTED] Or, by telephone at (212) [REDACTED]. Thank you for your time and consideration in participating in this research study.

Appendix H.3 Script 3.

Interview Script

Thank you for agreeing to meet with me and talk about your experiences and opinions of your personal emergency response system. I will ask you 9 prepared questions to understand how you like your PERS, and I might ask some additional questions if I need any clarification or if you raise interesting topics that I want to investigate further. You may call your personal emergency response system by whatever name you are familiar with, such as MedAlert. You don't have to answer any question you don't want to, and you may stop the interview at any time. You may ask me any question related to the interview before we begin.

Appendix I. Table1. Interview Guide

Interview Guide

Usefulness:

1. How helpful has your personal emergency response system been for you?
2. What makes your personal emergency response system most helpful for you?

Ease of use:

1. How simple is it for you to use your personal emergency response system?
2. What feature of your personal emergency response system makes it simple for you to use?

Intention to use:

1. What was your purpose for adopting a personal emergency response system?
2. Do you expect to continue utilizing your personal emergency response system?

Use:

1. What does it mean for you to utilize your personal emergency response system?
2. How often do you utilize your personal emergency response system?

Barriers to use:

1. What might prevent you from utilizing your personal emergency response system?

REFERENCES

- AARP. (2004). Designing Web Sites for Older Adults: Heuristics. Retrieved from http://www.aarp.org/olderwiserwired/owwresources/designing_web_sites_for_older_adults_heuristics.html
- AARP. (2010). Aging in Place: A State Survey of Livability Policies and Practices. Retrieved from <http://www.aarp.org/rgcenter/ppi/liv-com/aging-in-place-2011-full.pdf>
- Aging in Place: A State Survey of Livability Policies and Practices. Retrieved from <http://www.aarp.org/rgcenter/ppi/liv-com/aging-in-place-2011-full.pdf>
- Administration on Aging. (AoA). (2007). *A profile of older Americans: 2005*. Washington, DC.
- Administration on Aging. (AoA). (2013). *A profile of older Americans: 2012*. Washington, DC.
- Aging in Place Technology Watch. (2012). *Future of Home Care Technology*. Final-07-31-2012.pdf
- Aging in Place Technology Watch. (2015). *Industry Market Trends, Research & Analysis*. Final-06-11-2013.pdf
- Ajzen, I. (1985). From intentions to actions: A theory of planned behavior. In J. Kuhl and J. Beckman (Eds.): *Action-control: From Cognition to Behavior*, (pp. 11-39). Heidelberg: Springer.
- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50, 179-211.
- Ajzen, I. (2005). The Theory of Planned Behavior. Available at: <http://people.umass.edu/ajzen/tpbrefs.html>, accessed 3 march 2005.
- Ajzen, I., & Fishbein, M. (1970). The prediction of behavior from attitudinal and normative variables. *Journal of Experimental Social Psychology*, 6, 466-487.

- Alley, D, Liebig, P., Pynoos, J., Banerjee, T., & Choi, I.H.(2007). Creating elder-friendly communities: preparations for an aging society. *J Gerontol Soc Work. 2007; 49(1-2):1-18.*
- AmbitUSA. (2013). Retrieved from <http://www.ambitusa.com>
- American Institute on Aging. (2014). A Profile of Older Americans, Retrieved from <http://www.aoa.gov/aoa/stats/profile>.
- American Heart Association. (2014). Heart disease and stroke statistics—2015 update. A report from the American Heart Association Statistics Committee and Stroke Statistics Subcommittee. *Circulation* 2014; published online ahead of print, December 17, 2014.
- American Medical Association. (AMA). (1995). Guidelines for the Use of Assistive Technology: Evaluation Referral. *Primary Care for Persons with Disabilities: Access to Assistive Technology*. Retrieved from <http://www.ama-assn.org/ama1/pub/upload/mm/433/assistivetechology.pdf>
- American Medical Association. (AMA). (2009). *Guides to the Evaluation of Permanent Impairment*, 6th Edition.
- American Nurses Association. (ANA). (2001). *Code of ethics for nurses with interpretative statements*. Washington DC: ANA. Retrieved November 2, 1010. <http://www.ananursingethics.org/nursingethics.htm>
- American Nurses Association. (ANA). (2008). *Health System Reform Agenda*. Retrieved from <http://www.nursingworld.org/Content/.../ANAsHealthSystemReformAgenda.pdf>
- Assistive Technology Industry Association. (ATIA). (2012). Retrieved from aiainfo@atia.org

- American Telephone and Telegraph Company. (ATAT). (2012). Milestones in AT&T History. Retrieved from <http://www.corp.att.com/history/milestones.html>
- Bandura, A. (1977). Self-efficacy: Towards a unifying theory of behavioral change. *Psychology Review*, 84; 191-215.
- Bandura, A. (1988). Organizational Application of Social Cognitive Theory. *Australian Journal of Management*, 13(2), 275-302.
- Bazeley, P. (2009). Analyzing qualitative data: More than “identifying themes.” *Malaysian Journal of Qualitative Research*, 2, 6–22. Retrieved from http://www.researchsupport.com.au/More_than_themes.pdf
- Benbasat, I., & Barki, H. (2007). "Quo vadis, TAM?" *Journal of the Association of Information Systems*, 8 (4), 211–218.
- Brink, P. J., & Wood, M. J. (1998). *Advanced design in nursing research* (2nd Ed.). Thousand Oaks, CA: Sage.
- Bronikowski, A. M. & Flatt, T. (2011). Aging and its demographic measurement. *Nature Education Knowledge1*, 3.
- Burton-Jones, A., & Hubona, G.S. (2005). Individual differences and usage behavior: Revisiting a technology acceptance model assumption, *Database for Advances in Information Systems* 36(2), 58-77.
- Burton-Jones, A. & Hubona, G.S. (2006). The mediation of external variables in the technology acceptance model *Information and Management* 43(6), 706-717.
- Center for Accessible Technology. (CAT). (2013). Retrieved from www.cforat.org
- Centers for Aging Services Technologies.(CAST).(2013). Retrieved from www.agingtech.org

Centers for Disease Control and Prevention, National Center for Injury Control and Prevention
Web-based injury statistics query and reporting system (WISQRS) [Internet].Atlanta:
CDC; 2010 [cited 2010 April 8]. Retrieved
from <http://www.cdc.gov/injury/wisqars/index.html>

Centers for Disease Control and Prevention. (CDC). (2011, July 16). *Physical activity for everyone: Glossary of terms*. Retrieved June 3, 2015,
from <http://www.cdc.gov/physicalactivity/everyone/glossary/index.html>

Centers for Disease Control and Prevention. (CDC). 2011. Healthy Aging Research Network.
Retrieved from <http://www.cdc.gov/prc/pdf/han-booklet.pdf>

Centers for Disease Control and Prevention.(CDC). (2013). The State of Aging and Health in
America 2013. Atlanta, GA: Centers for Disease Control and Prevention, US Department
of Health and Human Services. Retrieved from <http://www.cdc.gov/aging>

Centers for Medicare and Medicaid Services. (CMS). (2012). Table 7.2, Persons Served, Visits,
Total Charges, Visit Charges, and Program Payments for Medicare Home Health Agency
Services: Calendar Year 2011. 2012. Medicare and Medicaid Supplemental Statistics.
Retrieved from <http://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/MedicareMedicaidStatSupp/2012.html>

Centers for Medicare & Medicaid Services.(CMS). (2013). Research, Statistics, Data &Systems.
Retrieved from <http://www.cms.gov>

Choi, N.G., & DiNitto, D. M. (2013). The Digital Divide among Low-Income Homebound Older
Adults: Internet Use Patterns, eHealth Literacy, and Attitudes toward Computer/Internet
Use. *Journal of Medical Internet Research*, 15(5), e9. Retrieved from
<http://www.jmir.org/2013/5/e93/>

- Cipriano, P. F., & Hamer, S. (2013). Special Report: Nursing, Technology, and Information Systems. *Enabling the ordinary: More time to care. American Nurse Today*, Volume 8, Number 11. 2013. p. SR4.
- Cowan, D., & Smith-Turner, A. (1999). The role of assistive technology in alternative models of health care for older people, Appendix 4, research volume 2, With Respect to old Age: Long Term Care-Rights and responsibilities, London: HMSO: 325.
- Cozby, P. C. (2009). *Methods of Behavioral Research: Tenth Edition*. New York, NY: McGraw-Hill.
- Czaja, S. J., Lee, C. C., Nair, S. N., & Sharit, J.(2008). Older Adults and Technology Adoption Proceedings of the Human Factors and Ergonomics Society Annual Meeting September 2008 52: 139-143.
- Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 319-340.
- Davis, F.D., Bagozzi, R.P., & Warshaw, P.R. (1989). Use Acceptance of Computer Technology: A Comparison of Two Theoretical Models. *Management Science*, 35, 982-1003.
- Dibner, A.S. (1981). A method for reducing anxiety in the home-bound elderly. *Journal of Geriatric Psychiatry*, 14,111-113.
- EveryoneOn. (2013). Retrieved from <http://www.everyoneon.adcouncil.org/>.
- Federal Communications Commission.(2011). 911 Wireless Services. Retrieved from <http://www.fcc.gov>
- Fishbein, M., & Ajzen, I.(1975). *Belief, attitude, intention, and behavior*. Reading, MA: Addison-Wesley.

- Fleming, J., & Brayne, C. (2008). Inability to get up after falling, subsequent time on the floor, and summoning for help: Prospective cohort study in people over 90. *British Medical Journal*, 337, a2227.
- Fowler, M.D.M. (Ed.) (2010). Guide to the code of ethics for nurses: Interpretation and application. Silver Spring, MD: ANA.
- Fox, S., Duggan, M. (2013). Pew Internet & American Life Project. Health information online. [pewinternet.org/Commentary/2011/.../Pew-Internet-Health.aspx](http://www.pewinternet.org/Commentary/2011/.../Pew-Internet-Health.aspx) Retrieved from http://www.pewinternet.org/pdfs/PIP_Healthtopics_May05.pdf. Accessed July 11, 2006.
- Freimuth, K. (2010). "Home Alone: Making it Work for Older Women." *Nursing Dimensions*. Fall 2010, 6(2), 4. Retrieved from http://www.son.wisc.edu/Documents/2010_documents_fall.pdf
- Greaves, J. R., & Cochran, S. (1989). The study of nursing informatics. *Image Journal of Nursing Scholarship*, 21(4), 227-231.
- Greene, S. M., Tuzzio, L., & Cherkin, D. (2012). A Framework for Making Patient-Centered Care Front and Center. *The Permanente Journal* (ISSN 1552-5767). Summer 2012, Volume 16 Number 3.
- Haley, C., & Andel, R. (2010). Correlates of physical activity participation in community dwelling older adults. *Journal of Aging and Physical Activity*, 18 (4), 373-389.
- Hall, S. (2010). The Paradox of Aging. *Human Ecology*. College of Human Ecology, Cornell University, Vol. 38, No. 2, Fall 2010.
- Hassmiller, S. (2010). Nursing's role in healthcare reform. *American Nurse Today*, September 2010. Vol.5 No. 9. Retrieved from <http://www.americannursetoday.com/article.aspx?id=7086>

- Healthy People 2020. (2013). U.S. Department of Health & Human Services. Retrieved from <http://www.healthypeople.gov/2020/topicsobjectives2020/overview.aspx?topicis=41>
- Heinbüchner, B., Hautzinger, M., Becker, C., & Pfeiffer, K. (2010). Satisfaction and use of personal emergency response systems. *Zeitschrift für Gerontologie und Geriatrie* 43(4), 219-23. Doi: 10.1007/s00391-010-0127-4
- Hessels, V., LePrell, G.S., & Mann, W.C. (2011). Advances in Personal Emergency Response and Detection Systems. *Assistive Technology*, 23: 152-161.
- Home Technology Systems, Incorporated. (2004). Seniors demographics. Retrieved March 4, 2004 from <http://www.hometechsystems.com/>.
- Hyer, K., & Ruddick, L. (1994). The effectiveness of personal emergency response systems in meeting the safety monitoring needs of home care clients. *Journal of Nursing Administration*, 24(6), 39-44.
- IndustryARC. (2015). Medical Alert Systems Market: By Type (Landline, Mobile, Standalone); By End User (Home, Senior Living Facilities, Assisted Living Facilities); By Components (Wireless Transmitter, Fall Detection Sensor, GSM, GPS, Microphone)- Forecast (2015-2020). Retrieved from <http://www.industryarc.com/Report/98/medical-alert-devices-market.html> Jul 13, 2015.
- Institute of Medicine (IOM). (2010). Report on the Future of Nursing: Leading Change, Advancing Health. Washington, DC: The National Academies Press. Retrieved from <http://www.nursingworld.org>
- Institute of Medicine (IOM). (2011). Health IT and Patient Safety: Building Safer Systems for Better Care. Nov 8, 2011. Retrieved from <http://www.iom.edu/Reports/>

- International Society for Gerontechnology. (ISG). (2013). *Designing Technology and Environment for Independent Living and Social Participation for Older Adults*. ISG Policy Plan 2013. Retrieved from http://gerontechnology.info/otherfiles/isg_policy_plan_2013.pdf
- John A. Hartford Foundation. (2013). Strategies and Grants. Retrieved from <http://www.jhartfound.org/grants-strategy/>
- Jensen, J.D., King, A.J., Davis, L.A, & Guntzville, L.M. (2010). Utilization of internet technology by low-income adults: the role of health literacy, health numeracy, and computer assistance. *Journal of Aging Health*, 22(6), 804-826.
- King, A. C. & King, D. K. (2010). Physical Activity for an Aging Population. *Public Health Reviews*, Vol. 32, No 2, 401-426.
- Koehn, M.L., & Lehman, K. (2008). Nurses' perceptions of evidence-based nursing practice. *Journal of Advanced Nursing*, 62(2), 209-15.
- Leading Age Technologies (CAST). (2013). Leading Age Ziegler 1000 Technology Adoption and Utilization Survey. Retrieved from http://www.leadingage.org/uploadedFiles/Content/About/CAST/Resources/LZ100_Technology_Survey_2013.pdf
- Legris, P., Ingham, J., & Collerette, P. (2003). Why do people use information technology: A critical review of the technology acceptance model. *Information and Management*. 40, 191-204.
- Li, C. (2013). The revised technology Acceptance Model and the impact of Individual Differences in Assessing Internet Banking Use in Taiwan. *International Journal of Business Information*, Vol. 8, No 1. 96-119.

- Li, X., Lv, Q., Li, C., Zhang, H., Li, C., & Jin, J. (2013). The relationship between expectation regarding aging and functional health status among older adults in China. *Journal of Nursing Scholarship*, 45(4), 328-335.
- Life Alert Emergency Response Incorporated. (2016). Retrieved from <http://www.lifealert.com/>
- Lifeline Systems. (1974). Company history. Retrieved from <http://www.fundinguniverse.com/company-histories/Lifeline-Systems-Inc.-Company-History.htm>.
- Madden, M. (2010). Older Adults and Social Media Report: Seniors, Social Networking, Broadband. Pew Internet and American Life Project. Retrieved from <http://www.pewinternet.org/2010/08/27/older-adults-and-social-media/>
- Mann, W.C., Ottenbacher, K. J., Fraas, L., Tomita, M. R., & Granger, C.V. (1999). Effectiveness of assistive technology and environmental interventions in maintaining independence and reducing home care costs for the frail elderly: *Archives of Family Medicine*, 8, 210-217.
- Mann, W.C., Belchior P., Tomita, M. R., & Kemp, B. J. (2005). Use of personal emergency response systems by older individuals with disabilities. *Assistive Technology*, 17(1), 82-88.
- Markoff, J. (2015, December 8). Artificial Friends for the Aging. *The New York Times. Science Times*. pp. D1, D6.
- McGonigle, D., & Mastrian, K. (2009). *Nursing informatics and the foundation of knowledge*. Boston, MA: Jones and Bartlett.
- McKenna, A.C., Kloseck, M., & Polgar, J. (2015). Purchasing and Using Personal Emergency Response Systems (PERS): how decisions are made by community-dwelling seniors in

- Canada. BMC Geriatr. 2015; 15: 81. Published online 2015 Jul 11. doi: 10.1186/s12877-015-0079-z
- McNeil, J.M. (1997). Americans with disabilities: 1994-95. US Bureau of the Census *Current Population Reports, P70-61*. Washington, DC: US Government Printing Office.
- Mitnitski, A.B., Graham, J.E., Mogilner, A.J., & Rockwood, K. (1999). The rate of decline in function in Alzheimer's disease and other dementias. *Journals of Gerontology. Series A (Biological Sciences and Medical Sciences)*, 54(2):M65-M69.
- Moeser, G., Moryson, H., & Schwenk, G. (2013). Determinants of Online Social Business Network Usage Behavior—Applying the Technology Acceptance Model and Its Extensions. *Psychology* 2013. Vol.4, No.4, 433-437. Published Online April 2013 in SciRes (<http://www.scirp.org/journal/psych>) <http://dx.doi.org/10.4236/psych>.
- Moody, H. R. (2006). *Aging: concepts and controversies*. Pine Forge Press.
- Morris, A., Goodman, J. & Brading, H. (2007). Internet use and non-use: views of older adults. DOI 10.1007/978-1-4419-1551-1. Springer: New York Dordrecht, Hedelberg, London.
- Munhall, P. L. (2007). *Nursing research: A Qualitative Perspective (Fourth Edition)*: Jones & Bartlett Publishers: Sudbury, Massachusetts.
- National Alliance for Caregiving, in collaboration with AARP. (2009). *Caregiving in the US*. Retrieved from http://www.caregiving.org/pdf/research/Caregiving_in_the_US_2009_full_report.pdf
- National Gerontological Nursing Association. (2013). Retrieved from <http://www.ngna.org>
- National Health Interview Survey (NHIS).(2012). Summary Health Statistics for U.S. Adults: National Health Interview Survey, 2012. Vital and Health Statistics. Series 10. Number 260. February, 2014.

National Institutes on Aging. (NIA). (2011). Global Health and Aging. Retrieved from <https://www.nia.nih.gov/research/publication/global-health-and-aging/living-longer>

National League for Nursing. (NLN). *Caring for older adults* (Vision Series). Retrieved from www.nia.nih.gov/aboutnln/livingdocuments/pdf/ninvision_2.pdf. Cited May 1, 2012

National Telecommunications and Information Administration.(1998). Falling Through the Net II: New Data on the Digital Divide. U.S. Department of Commerce. Retrieved from <https://www.ntia.doc.gov/legacy/data/index.html>

New England Emergency Response Systems.(2012). About New England Emergency Response Systems. Retrieved from <http://www.neers.com/index.php>

New York Long Term Home Health Care Program. (2011). Leading Age - *New York Reimbursement Programs for Aging Services Technology*. Retrieved from <http://www.leadingage.org>

Onwuegbuzie, A. J., Leech, N. L., & Collins, K. M. T. (2012). Qualitative analysis techniques for the review of the literature. *The Qualitative Report*, 17(Art. 56), 1-28. Retrieved from <http://www.nova.edu/ssss/QR/QR17/onwuegbuzie.pdf>

Ortman, J.M., Velkoff, V.A, & Hogan, H. *An Aging Nation: The Older Population in the United States. Current Population Reports*. Washington, DC: U.S. Census Bureau, 2014.

Pernecky, R., Pohl, C., Sorg, C., Hartmann, J., Tomic, N., Grimmer, T., Heitele, S., &Kurz, A. (2006). Impairment of activities of daily living requiring memory or complex reasoning as part of the MCI syndrome. *Int J Geriatr Psychiatry*. 2006 Feb; 21(2):158-62.

Pew Research Center. (2014). “*Millennials in Adulthood*.” Pew Research Center’s Social & Demographic Trends Project. 7 March 2014.Retrieved from <http://www.pewresearch.org/topics/millennials/>

- Philips Lifeline. (2010). *About Philips Lifeline* .Retrieved from<http://www.lifelinesys.com/>
- Philips Lifeline.(2011).Company history. Retrieved from
<http://www.fundinguniverse.com/company-histories/Lifeline-Systems-Inc.-Company-History.htm>
- Philips Lifeline. (2013). Emergency medical alert systems. Retrieved from
<http://www.lifeline.philips.com/>
- Polit, D. F., & Beck, C.T. (2012). *Nursing Research: Generating and Assessing Evidence for Nursing Practice*, 9th Edition. Lippincott Williams & Wilkins. Polkinghorne, D. (1983).*Methodology for the human sciences: Systems of inquiry*. Albany: State University of New York Press.
- Porter, E.J. & Ganong, L.H. (2002). Considering the use of personal emergency response systems: An experience of frail, older women. *Care Management Journal*,3 (4), 192-198.
- Rehabilitation Services Administration. (2013). U.S. Department of Education.
- Resnick, B., & Daly, M.P. (1998). Predictors of functional ability in geriatric rehabilitation patients. *Rehabilitation Nursing*, 23, 21-29.
- Rodeschini, G. (2011). Gerotechnology: A new kind of cure for aging? An analysis of the relationship between older people and technology. *Nursing and Health Sciences*, (2011), 13, 521-528.Doi: 10.1111/j.1442-2018.2011.00634.x
- Rowe, J.W. (2010). “Successful Societal Adaptation to the Aging of America,” *Public Policy & Aging Report* 21:4, p. 11-14.
- Sherwood, S., & Morris, J.N. (1980), *A Study of the Effects of an Emergency Alarm and Response System for the Aged: A Final Report*, Grant No. HS01788, National Center for Health Services Research.

- Steptoe, A. , Shankar, A., Demakakos, P., & Wardle, J. (2013). Social isolation, loneliness, and all-cause mortality in older men and women. Vol. 110. No. 15. 5797–5801,doi: 10.1073/pnas.1219686110
- Szanton, S. L., Thorpe, R. J., & Boyd, C. (2011). “Community Aging in Place, Advancing Better Living for Elders (CAPABLE): A Bio-Behavioral-Environmental Intervention to Improve Function and Advancing Health-Related Quality of Life in Disabled Older Adults.” *Journal of The American Geriatrics Society*, 59:12. 2314-20.
- The Center for Universal Design.(CUD). (2008).The Center for Universal Design - Universal Design History. Retrieved from <https://www.ncsu.edu/.../udhistory.htm>
- The Communications Act of 1934.Public Law Number 416, Act of June 19, 1934, ch. 652, 48 Stat. 1064, by the 73rd Congress. Retrieved from <http://www.fcc.gov> (2011)
- The Leadership Conference on Civil and Human Rights. (2013). Retrieved from <http://www.civilrights.org/resources/civilrights101/glossary.html>
- The Telecommunications Act of 1996. (2011). Title 3, sec. 301. Retrieved from <http://fcc.gov>
- Trademarkia, Incorporated. (2014). Retrieved from <http://www.trademarkia.com/assistnow-85134831.html>
- United Nations Department of Economic and Social Affairs. Population Aging 2006.Retrieved from <http://www.un.org/esa/population/publications/ageing/ageing2006/chart/pdf>. Accessed January 24, 2009
- United Nations (UN).(2013). World Population Ageing: 1950-2050. Department of Economic and Social Affairs, Population Division. Accessed online at www.un.org/esa/population/publications/worldageing19502050, on June 1, 2008.

- United Nations Educational Scientific and Cultural Organization World Report. (2005). Towards Knowledge Societies. Retrieved from <http://www.unesco.org/.../towards-knowledge-societies-unesco-world-report0>. ISBN 92-3-104000-6.
- Vasunilashorn, S., Steinman, B.A., Liebig, P. S., & Pynoos. J. (2012). "Aging in Place: Evolution of a Research Topic Whose Time Has Come." *Journal of Aging Research*, Volume 2012, Article ID 120952, 6 pages doi:10.1155/2012/120952
- Venkatesh, V. (2000). Determinants of perceived ease of use: Integrating Perceived Behavioral Control, Computer Anxiety and Enjoyment into the Technology Acceptance Model. *Information Systems Research* (11:4), 342-365.
- Venkatesh, V., & Davis, F. D. (2000). A Theoretical Extension of the Technology Acceptance Model: Four Longitudinal Field Studies, *Management Science*, 45 (2), 188-204.
- Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User Acceptance of Information Technology: Toward a Unified View. *MIS Quarterly*, 27 (3), pp. 425–478.
- Venkatesh, V., & Bala, H. (2008). Technology Acceptance Model 3 and a Research Agenda on Interventions. Article first published online: 9 MAY 2008. DOI: 10.1111/j.1540-5915.2008.00192.x. *Journal of Decision Sciences Institute*, 2008.
- Visiting Nurse Service of New York. (VNSNY). (2012). Retrieved from <http://www.vnsny.org/>
- Visiting Nurse Service of New York. (VNSNY). (2013). High Tech Services. Retrieved from <http://www.vnsny.org/why-vnsny/vnsny-difference/high-tech-services/>
- Visiting Nurse Service of New York. (VNSNY). (2014). Annual Reports: 2012 Annual Report: Transforming Lives, Transforming Communities. Retrieved from <http://www.vnsny.org/system/assets/0000/3392/2013AnnualReport.original.pdf?1385476393>

- Visiting Nurse Service of New York. (VNSNY). (2015). VNSNY Home Health Care Research Report. Retrieved from <http://www.vnsny.org/vnsny-research/#sthash.fzjvUIMI.dpuf>
- Wald, C.F., Strickland, O.L., & Lenz, E.R. (2010). *Measurement in Nursing and Health Research*. 4th edition. Springer Publishing Company, New York.
- WellAware. (2012). *WellAware system*. Retrieved from <http://www.wellawaresystems.com>.
- Wells, Ken. R. "Geriatric assessment tests." *Gale Encyclopedia of Nursing and Allied Health*. Ed. Jacqueline L. Longe. Vol. 2. 2nd ed. Detroit: Thomson Gale, 2006. Nursing Resource Center. Gale. CUNY - Graduate Center. 8 Nov. 2013. Retrieved from <http://find.galegroup.com/nrcx/infomark.do>
- Wolcott, H. F. (1994). *Transforming Qualitative Data: Description, Analysis, and Interpretation* Sage Publications. ISBN 0-8039-52813.
- World Health Organization. (WHO). (2007). *World Economic and Social Survey 2007: development in an ageing world*. New York: UNDESA; 2007).
- World Health Organization. (WHO).(1980). *The International Classification of Functioning, Disability and Health - ICF*. Geneva: World Health Organization; 2001. [Accessed September 6, 2012]. Retrieved from <http://www.who.int/classifications/icf/en/>
- World Health Organization. (WHO). (2007). *Global age-friendly cities: A guide*. WHO Press: Geneva, Switzerland. Retrieved from http://www.who.int/ageing/publications/Global_age_friendly_cities_Guide_English.pdf. Accessed January 9, 2012.
- World Health Organization.(WHO).(2011). *US National Institute of Aging: Global health and ageing pdf, 1.66Mb*. Retrieved from www.who.int/ageing/age_friendly_cities_net

World Health Organization.(WHO).(2014). Global strategy on diet, physical activity and health.

Retrieved from <http://www.who.int/dietphysicalactivity/pa/en/>

World Wide Web (WWW or “the Web”).(2013).Retrieved from

https://en.wikipedia.org/wiki/History_of_the_World_Wide_Web

Zickuhr, K. (2012). Report: Seniors, Social Networking, Broadband. Pew Research Center’s

Internet & American Life Project. Retrieved from

<http://www.pewinternet.org/2010/08/27/older-adults-and-social-media>.

Zickuhr, K., & Madden, M. (2012).Older adults and internet use. Report: Seniors, Social

Networking, Broadband. Pew Research Center’s Internet & American Life Project.

Retrieved from <http://pewinternet.or/Reports/2010/Older-adults-and-social-Media.asp>