Published in final edited form as:

Disabil Rehabil Assist Technol. 2018 February ; 13(2): 194–200. doi:10.1080/17483107.2017.1300693.

Assistive technology unmet needs of independent living older Hispanics with functional limitations

Elsa M. Orellano-Colón,

Occupational Therapy Program, School of Health Professions, Medical Sciences Campus, University of Puerto Rico, San Juan, Puerto Rico; Puerto Rico Assistive Technology Program, Research and Technology Vice-Presidency, San Juan, Puerto Rico

Marta Rivero-Méndez,

School of Nursing, Medical Sciences Campus, University of Puerto Rico, San Juan, Puerto Rico

Mauricio Lizama, and

Puerto Rico Assistive Technology Program, Research and Technology Vice-Presidency, San Juan, Puerto Rico

Jeffrey W. Jutai

Faculty of Health Sciences, University of Ottawa, Ottawa, ON, Canada

Abstract

Purpose—To identify: 1) the most frequently used AT by a sample of community-living older Hispanics; 2) their AT needs, 3) the AT that would not be used by the sample, and 4) the factors associated with the willingness to use AT.

Materials and methods—We used a cross-sectional descriptive study design with a purposive sample of 60 individuals 70 years and older living in Puerto Rico. Data collection tools included a socio-demographic questionnaire and the Assistive Technology Card Assessment. We used descriptive statistics to identify the sample AT use and needs, Chi-Square (χ^2) to determine the frequency distribution of the socio-demographic variables and the Spearman's rank correlation coefficient (ρ) to describe the strength of the association between these variables and the willingness to use AT devices.

Results—The sample had unmet needs for AT devices for cooking, home tasks, and home safety. A higher number of health conditions as well as having low educational levels were associated with willingness to use AT devices.

Conclusions—Policy implications are discussed supporting the role of rehabilitation professionals, state government, and community-based programs, including the Area Agencies on Aging, in providing culturally relevant AT education and accessibility to assistive devices.

Corresponding Author: Elsa M. Orellano-Colón, Occupational Therapy Program, School of Health Professions, Medical Sciences Campus, University of Puerto Rico, PO Box 365067 San Juan, 00936-5067, Puerto Rico, elsa.orellano@upr.edu.

Disclosure of interest

The authors report no conflicts of interest.

Keywords

aging; low cost assistive technology; Hispanics; activities of daily living; cultural relevance; assistive technology assessment

Introduction

People are living longer, with chronic conditions which are the leading causes of death, disabilities, and health care costs in the USA [1,2]. Older people with chronic conditions often experience diminished quality of life, generally because of a long period of functional decline and disability. This can affect a person's ability to perform important and essential activities, such as cooking, taking medications, or getting dressed. Loss of the ability to care for oneself means further loss of safety and independence, often leading to institutionalization [3]. Fortunately, disability in the performance of everyday life activities is not an irreversible event. The use of low cost AT, such as jar openers, seat lifts for sofas, reachers, and walker baskets, are beneficial in alleviating older adults' disabilities, promoting independent living and safety, reducing the need for personal assistance and institutionalization, decreasing health care costs, and enhancing quality of life [4–10].

A number of studies have reported on the use of assistive technologies among older people. Many of these studies have surveyed elders with visual and hearing impairments [11,12] mobility impairments [13], arthritis [14], and stroke [15]. The samples of these studies have been primarily white people with little or no representation from Hispanic populations. Recent research has also investigated the use of AT and the perceived unmet need of AT among older people [16]. The results showed that the most commonly used types of AT in the younger older adults were for communication (21%) whilst 8% expressed a perceived unmet need of this type of AT. Moreover, AT for furnishings and adaptation (e.g. adjustable chairs and beds, handrails and reachers/grabbers) were used to high extent (40%) by individuals already in their 70s. Assistive technology for personal care (i.e. toileting, bathing and showering) was used by 10%. In another study conducted with 57 older adults from New York found that the top three most frequently identified categories of AT were aids for hearing (23%), aids for laundry (23%), and aids for vision (22%) [17]. This study found that magnification devices, laundry baskets on wheels, and amplified phone devices were the most frequently identified AT-related needs of participants.

Notwithstanding this evidence pertaining to use of AT devices, Hispanics with disabilities have not benefited equally from using AT. This is, Hispanics with disabilities living in the USA, including Puerto Ricans, have reported a much lower rate in the use of AT device (59%) compared to non-Hispanic whites (71%) [18]. Older people living in Puerto Rico could be at higher risk of unmet AT needs due to living in a resource poor environment with higher predictors for not using AT. This is, older Puerto Ricans have reported lower educational attainment and household income compared to older people of any racial or ethnic group living in the USA [19].

To meet the challenge of an ageing society and of the increasing number of ageing people living at home and needing health preventive services, it is important that interdisciplinary

teams conduct research as to what are the culturally relevant AT needs that will to help them to live independently in home for as long as possible. New knowledge as to what are the culturally relevant factors associated with the willingness to use AT devices is also needed in light of the importance of the personal and social determinants for using AT devices.

The overall aim of this study was to explore AT use among a Hispanic community living older adults with functional limitations. Specifically, we explored (1) the most frequently used AT by the sample, (2) the AT for which there is the highest perceived need, (3) the AT that would not be used by the sample, and (4) the factors associated with the willingness to use AT. The findings of this study, could contribute to gain a better understanding of the AT needs among the vulnerable and neglected population of older Hispanics with functional limitations. This new knowledge could be used to develop culturally appropriate interventions to expand usage of and to promote equal access to AT in order to lower the prevalence of disabilities in older Hispanics.

Material and Methods

Design

A cross-sectional descriptive study design was used to identify AT that the sample already use, would not use, and would use if they had the device. The study was approved by the Institutional Review Board of the Medical Sciences Campus, University of Puerto Rico. Informed consent, was obtained from all participants. All information was kept confidential and locked and secure at all times, ensuring confidentiality for the participants.

Measures

The following measures were collected by the four occupational therapy authors who were familiar with the instruments and were supervised regularly by the principal author. Data collection was conducted in the participants' home.

Cognition was assessed as part of the inclusion criteria using the 30 points Spanish version of the Minimental State Examination (MMSE) [20]. Socio-demographic variables were obtained by using the socio-demographic questionnaire developed for the purpose of this study. It elicited information on age, sex, education level, medical condition, and monthly income.

The AT needs were gauged using the Assistive Technology Card Assessment (ATCA). The ATCA was designed by the occupational therapy researchers of this study. The first step in the development of the ATCA consisted of a comprehensive literature review. The researchers identified the 49 most relevant AT used by community-living older adults in previous studies. The preliminary draft was tested for content validity by using a content-validity ratio exercise filled by a panel of four experts in aging and assistive technology to determine the AT that should be included in the ATCA. After addressing the recommendations of this panel, a preliminary ATCA Scoring Form was developed that included the set of instructions, the glossary, and 48 cards with photos of the AT devices. The ATCA was then tested by a sample of 10 older adults, who gave recommendations to improve the usability, understandability, and clarity of the instrument. The final ATCA

included 50 AT cards depicting pictures of older adults using AT devices in 11 categories: AT for reading, AT for Mobility, AT for Personal Hygiene, AT for Toilet use, AT for Cooking, AT for Home Care, AT for Medication Management, AT for Communication, AT for Home Accessibility, and AT for Home Security.

Setting and sample

A purposive sample of 60 individuals was recruited from rural as well as urban sectors in Puerto Rico. Diverse participants were also sought, as it is thought that varying populations of older adults may have very different needs for using AT. Inclusion criteria for participants included (a) Hispanic men and women 70 years and older; (b) living independently in the community; (c) not receiving home care; (d) reported the need for help or difficulties with two instrumental activities of daily living (IADL) or one or more activities of daily living (ADL); and (e) with no cognitive impairment as measured by the Mini-mental Status Exam (MMSE). Participants were excluded if they were (a) non-Hispanics; if were (b) institutionalized; or if (c) they have dementia and severe impairments that requires specialized AT equipment. Specialized AT equipment was defined as AT devices used to compensate for severe physical, communication, or sensory disabilities such as mobile hoist lifters, augmentative and alternative communication devices, and computer screen readers. These criteria were designed to recruit older people who experience some difficulties with everyday activities but who were not totally dependent, homebound or receiving services to address functional problems.

Procedure

Participants from this study were recruited using flyers in locations frequently visited by older adults, such as senior centres, churches, and doctors' offices. The snowball sampling technique was also used and participants were asked for assistance to help identify other people. Interested participants were asked to call the researchers of this study. During the first telephone contact with the participant, the researchers assessed the first four inclusion criteria to determine their eligibility and if appropriate for the study, agree an appointment for the administration of the study's assessment tools at their home. During the first meeting, the researchers provided the participants with a full explanation of the study and the consent form. The procedure of this study is depicted in figure 1. After the consent form procedures, the researchers administered to the participants the socio-demographic questionnaire using an interview format. Finally, participant were requested to sort the ATCA cards into the following labels: *I use this equipment*, *I have this equipment but I don't use it*, *I wouldn't use this equipment*, *I would use this equipment presently but I don't have it*, and *I would use this equipment if I needed to*. A glossary featuring each AT with a definition was provided for each participant to assist them understand the use of the device depicted in the cards. At the end of the process, participants were asked to name other equipment that he/she uses at present and was not mentioned on the list. The researchers were available to help participants complete the ATCA.

Analysis

Data from the Socio-demographic Questionnaire and the Assistive Technology Card Assessment was analyzed using central tendency descriptive statistics. Data to explore the

associations between socio-demographic variables and willingness to use AT devices was analyzed using the non-parametric statistic Chi-Square (χ^2) to determine the frequency distribution of the socio-demographic variables and the Spearman's rank correlation coefficient (ρ) to describe the strength of the association between these variables and the willingness to use AT devices. Statistical analysis was conducted using Package for the Social Sciences (SPSS) software release 21.0 (SPSS, Chicago, IL).

Results

Specific socio-demographic data results are listed in table 1. Participants ranged in age from 70 to 97 years, with the overall mean age of 77. The sample was predominantly females with low educational level and low incomes. The top three health conditions were hypertension, musculoskeletal disorders and diabetes.

The most frequently used AT by a sample

On a list of 50 AT devices, participants selected the AT most owned and used. The top five AT most frequently identified by participants as "I already have this", were: (1) glasses; (2) pill organizers; (3) cane; (4) hand shower; and (5) grab bars (see table 2 for the frequencies and percent of the complete list of AT devices). The top three most frequently identified categories of AT for "I already have this" were: (1) medication (50%); personal hygiene (45.9%), and home safety (30.5%).

The AT for which there is the highest perceived need

Table 3 shows the results of the ATs most frequently identified as "I would use that but do not have it." The top five AT devices the sample reported the highest perceived need were 1) jar openers; (2) seat lift; (3) laundry basket with wheels; (4) nonslip rubber mat, and; (5) shopping cart with wheels. The top three most frequently identified categories of AT from "I would use this but do not have it" were: (1) Cooking (46.6%); (2) Home Tasks (37.3%); and (3) Home Safety (32.2%).

AT most frequently identified as "I would not use this"

The top five AT devices that the sample reported they would not use even if available were: (1) text enlarger for PC, tablet or cellular; (2) handle for carry bags; (3) remote control for electrical equipment; (4) long-handle duster, and; (5) high stool with long handle. Refer to table 4 for full results. The top three most frequently identified categories of AT from "I would not use this" were: (1) Communication (47.8%); (2) Home Accessibility (35.7%) and (3) Reading (29.3%).

Factors explaining the construct of willingness to use AT devices and socio-demographic characteristics

There was not statistical significant association between the willingness to use AT devices and educational level ($\rho = -.123$, $p = .350$) and between the willingness to use AT devices and age ($\rho = -.044$, $p = .737$). A moderate association was found between the willingness to use AT devices and the number of conditions reported by participants whereas the higher the willingness to use AT devices, the higher the number of conditions being reported ($\rho =$

0.45 $p < .001$). There was also a moderate association between the willingness to use AT devices and the income reported by participants whereas the higher willingness to use AT devices, the lower income being reported ($\rho = -0.48$ $p < .000$).

Discussion

The rapid growth of the older population makes it necessary to develop research targeted to address this population needs to maintain their independence as long as possible. Assistive technology is one of the tools that have been used successfully to maintain older adults' independence. Therefore, in this study we sought to explore the most frequently used AT by a sample of community-living older Hispanics, the AT needs of this sample, the AT that would not be used by the sample, and the factors associated with the willingness to use AT.

The most frequently used AT by a sample

Eighty-eight percent of the participants of this study reported using glasses. The results of the current study are consistent with the results from previous studies indicating the use of glasses to compensate for visual impairments are common in later life [21,22]. Other frequently used AT devices identified by the participants were pill organizers, canes, hand shower, grab bars and night light. These devices are used to compensate limitations in basic activities of daily living and most of the typically covered by older Puerto Ricans healthcare plan. However, the use of these AT devices differs from the results found in a previous study conducted with frail older people, in which the top five most important and used devices reported by the sample were eyeglasses, canes, wheelchairs, walkers, and telephones [23]. These findings demonstrate that different types of AT are used by older people with different levels of functional limitations. Therefore, AT interventions should be tailored to meet the changing needs of older people as they age or acquire independent living disabilities.

The AT for which there is the highest perceived need

The top three devices participants reported as they would use it if they have them were jar openers, seat lift, and laundry baskets with wheels. These devices compensate for diminished energy and strength in the performance of predominantly instrumental activities of daily living. These need for these AT devices are consonant with the symptoms of the sample most prevalent reported health conditions (hypertension, musculoskeletal disorders, and diabetes). Moreover, it is well known that physiological effects of aging, such as loss of strength and endurance, might decrease tolerance for performing physically demanding activities [24,25]. Our results are consistent with the findings of Cheek, Nikpour and Heather [24] in which older adults from Brazil demonstrated a significant unmet need for assistive devices to compensate for energy and strength deficits in the performance of activities of daily living. However, the results of the current study differ from the results of the study conducted by Gitlow [17] which found that the most frequently identified AT needs were hands free magnifiers, laundry basket with wheels, and amplified phones. These findings highlight the variation existent among the needs from different older populations, thus requiring a client-centre approach when assessing AT needs. Moreover, the AT needs identified by our sample are for devices not covered by the Medicare Advantage, the

predominant healthcare plan in Puerto Rico, due to not being considered a medically necessary durable medical equipment (DME) [26].

AT identified as “I would not use it”

The AT most frequently AT identified by the participants as I would not use it were: enlarged text for PC, tablet or cellular; handle for carry bags, and; remote controls for electrical equipment. Lack of interest for using electronic AT devices was related to the participants' perception of complexity for learning and using these devices, plausibly explained by the sample low educational levels and lack of knowledge of AT. This is consistent with a previous study in which older adults reported preferences for simple versions of technology in response to frustration associated with overly complex devices [27].

Factors explaining the construct of willingness to use AT devices and socio-demographic characteristics

This study found a moderate association between a higher willingness to use AT devices with a higher number of conditions reported by participants. It is well known that the presence chronic conditions impact the independence and functional performance of older people [28]. Therefore, the higher number of health conditions, the higher the probability of functional limitations. Since AT can help older individuals maintain or increase levels of independence and autonomy [29] those with higher functional limitations are those with more willingness to use AT devices. There was also a moderate association between a higher willingness to use AT devices with a lower the income being reported. Evidence form National data reveals that people with low incomes are less healthy than those with higher incomes [19]. Since the presence of health conditions may have a negative impact in older people functional abilities, those with lower income could have been more functionally dependent, thus more willing for using AT devices. Future research must be conducted with a larger sample size to confirm this finding.

Currently, Puerto Rico, a territory of the USA since 1898, is living a financial crisis related to the amount of debt owed by its government. This crisis is pushing the health care system to collapse and accelerating the emigration of thousands of Puerto Ricans to the USA in their productive years [30]. As a result, the population of older people in Puerto Rico is rapidly increasing, with 40% of older Puerto Ricans living below poverty levels as reported by the USA Census in 2010 [31]. Since living in a situation of hardship and economic precariousness is a common experience among older Puerto Ricans [32], low cost AT becomes an important intervention for this or any population living in a resource poor community. In addition, low costs AT interventions are also needed to promote access and use of AT devices that are typically not covered by health care plans and highly unknown by older people.

The present study has several limitations. First, we used a purposive and small sample of people who were 70 year or older, therefore results are not generalizable of the community of Hispanic dwelling older adults with functional limitations in Puerto Rico. Second, this study includes collecting data at one point in time in a single assessment session. Third, we

relied on self-report methods that is subject to memory errors which and does not provide other tools to corroborate participants' information.

Conclusion

Overall, the results of the study indicate that the Hispanic older adults with functional limitations living independently in Puerto Rico have needs for AT devices that are not being met, particularly for devices to compensate for physical limitations and increase safety performance in instrumental activities of daily living. Information regarding which are the AT needs for everyday life can contribute to increase effectiveness of the supply of AT for this population. Even more important is the necessity of further development of rehabilitation services as well as AT information and services essential for future planning and policy to improve older Hispanics health care through better access to AT. Rehabilitation professionals could use these findings to explore with community-living older Hispanics their AT needs for specific daily activities and suggest any AT devices that may be helpful and are culturally relevant. For example, since AT needs were more related to instrumental activities of daily living, rehabilitation professionals are urged to explore AT needs beyond the typical venue of basic activities of daily living with Hispanic populations.

Some of these devices may be covered or reimbursable by health care plans, such as mobility devices. However, new policies need to be developed to advocate for increased healthcare coverage of low tech AT devices that could be highly beneficial to older people with functional limitations. Moreover, rehabilitation professionals could urge older people and family and caregivers to securing AT devices for them, since the costs of many AT devices identified in this study are relatively low, are becoming readily accessible through retail stores and the internet, and could be used safely by most elders. It is also recommended that community-based programs administered by the state government, the Area Agencies of Aging, or operated through Medicare provide education, training, loans, purchasing, and delivery of low AT devices that can compensate for older people functional limitations. Older people could pay out of their pocket, or could contribute toward their purchase based on income. Another policy initiative could provide education to community-living older Hispanics about AT devices availability, and use to promote safety and increased performance in daily activities through each state's public health department. These initiatives may expand usage of AT and to promote older Puerto Ricans equal access to technologies that enable greater social participation and quality of life for this vulnerable and neglected population.

Further studies are needed to investigate why people with low socio-economic levels are not obtaining the AT that they identified that they need in this study. Investigating why older Hispanics do not have the devices that they need may help inform the need for policy change.

Acknowledgments

This work was supported by the Hispanics-In-Research Capability: SoHP & SoM Partnership (HiREC) Endowment Program, the National Institute of Minority Health and Health Disparities (NIMHD), the National Institutes of Health; under Grant Number S21MD001830; the Puerto Rico Clinical & Translational Research Consortium,

National Institute on Minority Health and Health Disparities of the National Institutes of Health; under Award Number 2U54MD007587; and the Puerto Rico Assistive Technology Program, University of Puerto Rico. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health. We would like to express our deepest gratitude to all individuals who participated in the study.

References

1. Ward BW, Schiller JS, Goodman RA. Multiple chronic conditions among US adults: a 2012 update. *Prev Chronic Dis*. 2014; 11(E62):130–389.
2. Centers for Disease Control and Prevention [Internet]. Atlanta: [cited 2016 Dec 20]. Available from: <http://www.cdc.gov/nchs/fastats/deaths.htm>
3. Hootman JM, Brault MW, Helmick CG, et al. Prevalence and most common causes of disability among adults—United States, 2005. *MMWR*. 2009; 58:421–426. [PubMed: 19407734]
4. Cook, A., Miller Polgar, J. Cook and Hussey's Principles of Assistive Technology. 4. St. Louis (MO): Elsevier; 2008.
5. McCreadie C, Tinker A. The acceptability of assistive technology to older people. *Ageing Soc*. 2005; 25(1):91–110.
6. Tinker A. Introducing assistive technologies to the homes of older people: the REKI research project. *Housing, Care and Support*. 2004; 7:30–36.
7. Mortenson WB, Demers L, Fuhrer MJ, et al. Effects of an assistive technology intervention on older adults with disabilities and their informal caregivers: An exploratory randomized controlled trial. *Am J Phys Med Rehabil*. 2013; 92(4):297–306. [PubMed: 23291602]
8. Day H, Jutai J, Woolrich W, et al. The stability of impact of assistive devices. *Disabil Rehabil*. 2001; 23(9):400–404. [PubMed: 11394591]
9. Lin IF, Wu HS. Activity limitations, use of assistive devices or personal help, and well-being: variation by education. *Gerontol B Psychol Sci Soc Sci*. 2014; 69:S16–25.
10. Wilson DJ, Mitchell JM, Kemp BJ, Adkins RH, Mann W. Effects of assistive technology on functional decline in people aging with a disability. *Assist Technol*. 2009; 21:208–217. [PubMed: 20066887]
11. Becker S, Wahl HW, Schilling O, et al. Assistive device use in visually impaired older adults: Role of control beliefs. *Gerontologist*. 2005; 45(6):739–746. [PubMed: 16326655]
12. Eklund K, Dahlin-Ivanoff S. Low vision, ADL and hearing assistive device use among older persons with visual impairments. *Disabil Rehabil Assist Technol*. 2007; 2(6):326–34. [PubMed: 19263563]
13. Carbone LD, Satterfield S, Liu C, et al. Assistive walking device use and knee osteoarthritis: results from the Health, Aging and Body Composition Study (Health ABC Study). *Arch Phys Med Rehabil*. 2013; 94(2):332–9. [PubMed: 23041146]
14. Pölluste K, Kallikorm R, Mätkik E, et al. Assistive devices, home adjustments and external help in rheumatoid arthritis. *Disabil Rehabil*. 2012; 34(10):839–45. [PubMed: 22023483]
15. Kim O, Kim JH. Falls and use of assistive devices in stroke patients with hemiparesis: Association with balance ability and fall efficacy. *Rehabil Nurs*. 2015; 40(4):267–74. [PubMed: 25042606]
16. Löfqvist, C., Haak, M., Slaug, B. The use of assistive technology in different age-groups of old people. In: Encarnação, P.Azevedo, L.Gelderblom, GJ., et al., editors. Assistive technology research series. 2013. Vol. 33. Amsterdam: IOS Press; 2013. p. 22–26.
17. Gitlow L, Eastman E, Gefell A, et al. Assessing assistive device needs of community dwelling older adults in Tompkins County. *Phys Occup Ther Geriatr*. 2012; 30:368–382.
18. Kaye HS, Yeager P, Reed M. Disparities in usage of assistive technologies among people with disabilities. *Assist Technol*. 2008; 20:194–203. [PubMed: 19160906]
19. Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Division of Population Health. BRFSS Prevalence & Trends Data [online]. 2015. [cited 2016 Dec 28]. Available from: <https://www.cdc.gov/brfss/brfssprevalence/>

20. Shrout PE, Canino GJ, Bird HR, et al. Mental health status among Puerto Ricans, Mexican Americans, and Non-hispanic Whites. *Am J Community Psychol.* 1992; 20:729–752. [PubMed: 1302447]
21. Horowitz A, Brennan M, Reinhardt JP, et al. The impact of assistive device use on disability and depression among older adults with age-related vision impairments. *J Gerontol B Psychol Sci Soc Sci.* 2006; 61B:S274–S280.
22. Ocepek J, Prosic Z, Vidmar G. Assistive technology and its role among the elderly-A survey. *Informatica Medica Slovenica.* 2012; 17:9–15.
23. Mann W, Llanes C, Justiss M, et al. Frail older adult's self-report of their most important assistive device. *OTJR.* 2004; 24:4–12.
24. Cheek P, Nikpour L, Nowlin H. Aging well with smart technology. *Nurs Adm Q.* 2005; 29:329–338. [PubMed: 16260997]
25. Haggblom-Kronlof G, Sonn U. Use of assistive devices--a reality full of contradictions in elderly persons' everyday life. *Disabil Rehabil Assist Technol.* 2007; 2:335–345. [PubMed: 19263564]
26. U.S. Centers for Medicare & Medicaid Services [Internet]. Baltimore MD: Your medical coverage; [cited 2016 Dec 17]. Available from: <https://www.medicare.gov/coverage/durable-medical-equipment-coverage.html>
27. Heinz M, Martin P, Margrett J, et al. Perceptions of technology among older adults. *J Gerontol Nurs.* 2013; 39:42–51.
28. Puthoff ML, Nielsen DH. Relationships among impairments in lower-extremity strength and power, functional limitations, and disability in older adults. *Phys Ther.* 2007; 87:1334–1347. [PubMed: 17684086]
29. Beech, R., Roberts, D. Assistive technology and older people (research briefing). Social Care Institute for Excellence; 2008.
30. Yuhas, A. Economic exodus means two-thirds of Puerto Ricans may soon live in states. *The Guardian* [Internet]. 2015 Jul 2. [cited 2016 Dec 17]. Available from: <https://www.theguardian.com/world/2015/jul/02/puerto-rico-economy-exodus-us-mainland>
31. U.S. Bureau of the Census [Internet]. Washington,(DC): The Bureau Census of Population, Population by sex and selected age groups for the United States, Regions, States and Puerto Rico; 2010. [cited 2016 Dec 17]. Available from: <http://www.census.gov/programs-surveys/popest.html>
32. Vera H, Rosario I, Pietri L, et al. Niveles de ansiedad y depresión en una muestra de personas jubiladas del sur y oeste de Puerto Rico y la crisis económica actual. *Informes Psicológicos.* 2014; 14(1):13–30.

Figure 1.

Study Procedures – This figure shows the procedural steps of the study, beginning with the consent form procedures, followed by the Minimental State Examination eligibility criteria, and culminating with the data collection surveys.

Table 1

Socio-demographic characteristics of the participants.

Variables	Total <i>n</i> = 60
Age Range (Min, max)	70–97
Mean (SD)	77 (6.27)
Sex, <i>n</i> (%)	
Female	40 (66.7)
Male	20 (33.3)
Educational Level, <i>n</i> (%)	
High school or less	48 (80)
Some college education	12 (20)
Monthly Income, <i>n</i> (%)	
Low(<\$1000)	50 (83)
Medium (\$1000–\$2000)	8 (13)
High (>\$2000)	2 (3)
Health Conditions, <i>n</i> (%)	
Hypertension	35 (58)
Musculoskeletal	33 (55)
Diabetes	32 (53)
Visual	15 (25)
Respiratory	13 (23)
Cardiac	12 (20)
Overweight	12 (20)

Min = Minimum; Max = Maximum; SD = Standard Deviation

Table 2

Assistive technology devices identified as “I Already Have This”

Assistive Technology	Responses	Percentage
Glasses	53.0	88.3
Pill Organizers	52.0	86.7
Cane	43.0	71.1
Hand Shower	40.0	66.7
Grab Bars	40.0	66.7
Night Light	37.0	61.7
Tub Bench	28.0	46.7
Long-Handled Dustpan	28.0	46.7
Nonslip Mat	27.0	45.0
Long-Handled Sponge	26.0	43.3
Electric Can Opener	24.0	40.0
Reacher	23.0	38.3
Simple Cellular	20.0	33.3
Simple TV Remote Control With Large Buttons	21.0	35.0
Walker	19.0	31.7
Hand Held Magnifier	18.0	30.0
Rail For Bed	18.0	30.0
Lever Knobs	18.0	30.0
Jar Openers	15.0	25.0
High Stool With Long Handle	15.0	25.0
Long-Handle Shoe Horn	13.0	21.7
Emergency Alert System	13.0	21.7
Built-Up Handles For Utensils	12.0	20.0
Laundry basket with Wheels	10.0	16.7
Long-Handle Duster	10.0	16.7
Shopping Cart On Wheels	9.0	15.0
Medications Reminder	8.0	13.3
Wheelchair	7.0	11.7
Long-Handle Cleaning Brush	7.0	11.7
Commode 3 In 1	6.0	10.0
Phone With Amplified Keys	6.0	10.0
Locator Keys	6.0	10.0
Adhesive Tape To Stabilize Rugs	5.0	8.3
Nail Clipper With Magnifier	4.0	6.7
Rails Around Toilet	4.0	6.7
Amplified Phone	4.0	6.7
Raised Toilet Base	3.0	5.0
Dressing Stick	3.0	5.0
Raised Toilet Seat	2.0	3.3

Assistive Technology	Responses	Percentage
Text enlarger for PC, tablet or cellular	1.0	1.7
Bed or Chair Lifts	1.0	1.7

Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript

Table 3

AT identified as “I Would Use This but do not Have It”

Assistive Technology	Responses	Percentage
Jar Openers	35.0	58.3
Seat Lift	34.0	56.7
Laundry basket with Wheels	30.0	50.0
Nonslip Rubber	29.0	48.3
Shopping Cart on Wheels	29.0	48.3
Reacher	28.0	46.7
Built-Up Handles for Utensils	27.0	45.0
Adhesive Tape to Stabilize Rugs	27.0	45.0
Long-Handle Cleaning Brush	26.0	43.3
Emergency Alert System	26.0	43.3
Medications Reminder	25.0	41.7
Text Enlarger	24.0	40.0
Magnifier that I do Not Have to Hold	22.0	36.7
Bed Or Chair Lifts	22.0	36.7
Long-Handle Shoe Horn	22.0	36.7
Sock Aid	22.0	36.7
Long-Handle Sponge	21.0	35.0
Electric Can Opener	21.0	35.0
Rails Around Toilet	19.0	31.7
Locator Keys	18.0	30.0
Nail Clipper with Magnifier	17.0	28.3
Nonslip Mat	17.0	28.3
Dressing Stick	17.0	28.3
Long-Handle Dustpan	17.0	28.3
Remote Controls for Electrical Equipment	16.0	26.7
Tub Bench	15.0	25.0
Button Hook	15.0	25.0
Handle for Carry Bags	15.0	25.0
Hand Shower	13.0	21.7
Raised Toilet Base	13.0	21.7
Text Enlarger for PC, Tablet or Cellular	11.0	18.3
Rail for Bed	11.0	18.3
Simple Cellular	11.0	18.3
Simple TV Remote Control with Large Buttons	11.0	18.3
High Stool with Long Handle	11.0	18.3
Long-Handle Duster	10.0	16.7
Scooter	9.0	15.0
3 in 1 Commode	9.0	15.0
Lever Knobs	9.0	15.0

Assistive Technology	Responses	Percentage
Walker	8.0	13.3
Amplified Phone	8.0	13.3
Grab Bars	7.0	11.7
Raised Toilet Seat	6.0	10.0
Hand Held Magnifier	5.0	8.3
Night Light	5.0	8.3
Wheelchair	3.0	5.5
Phone with Amplified Keys	3.0	5.5
Glasses	2.0	3.3
Cane	1.0	1.7
Pill Organizers	1.0	1.7

Table 4

AT identified as “I Would Not Use This”

Assistive Technology	Responses	Percentage
Text Enlarger for PC, Tablet or Cellular	40.0	66.7
Handle for Carry Bag	35.0	58.3
Remote Controls for Electrical Equipment	34.0	56.7
Long-handle Duster	33.0	55.0
High Stool with Long Handle	31.0	51.7
Raised Toilet Seat	30.0	50.0
Phone with Amplified Keys	30.0	50.0
Amplified Phone	29.0	48.3
Scooter	28.0	46.7
Simple Cellular	27.0	45.0
Bed or Chair Lifts	26.0	43.3
Adhesive Tape to Stabilize Rugs	24.0	40.0
Sock Aid	23.0	38.3
Long-handle Cleaning Brush	22.0	36.7
Magnifier that I do not Have to Hold	21.0	35.0
Nonslip Rubber	21.0	35.0
Button Hook	20.0	33.3
Text Enlarger	18.0	30.0
3 in 1 Commode	18.0	30.0
Locator Keys	18.0	30.0
Nail Clipper with Magnifier	17.0	28.3
Rails for Bed	16.0	26.7
Lever Knobs	16.0	26.7
Raised Toilet Base	15.0	25.0
Dressing Stick	12.0	20.0
Electric Can Opener	12.0	20.0
Shopping Cart on Wheels	12.0	20.0
Night Light	12.0	20.0
Simple TV Remote Control	10.0	16.7
Hand Held Magnifier	9.0	15.0
Nonslip Mat	8.0	13.3
Built-up Handles for Utensils	8.0	10.0
Long-handled Dustpan	8.0	13.3
Rails Around Toilet	7.0	11.7
Medications Reminder	7.0	11.7
Laundry basket with Wheels	6.0	10.0
Reacher	6.0	10.0
Wheelchair	4.0	6.7
Seat Lift	4.0	6.7

Assistive Technology	Responses	Percentage
Long-handle Sponge	4.0	6.7
Long-handle Shoe Horn	4.0	6.7
Jar Openers	4.0	6.7
Emergency Alert System	4.0	6.7
Pill Organizers	3.0	5.0
Hand Shower	1.0	1.7
Walker	1.0	1.7
Cane	1.0	1.7
Tub Bench	1.0	1.7
Grab bars	1.0	1.7
Glasses	0.0	0.0