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Assistive Technology Self-management Intervention for Older Hispanics: A Feasibility Study

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Abstract

Purpose.—Hispanics living in Puerto Rico have a much higher prevalence of disabilities compared to older adults living in the US. Even though assistive technology (AT) can overcome disabilities, Hispanics are among the least likely to use AT. The purpose of this study was to assess the feasibility of an assistive technology (AT) and disability self-management intervention concerning recruitment, retention, adherence, acceptability, preliminary evaluation of participants' responses to intervention, and preliminary data about efficacy.

Methods.—A mixed-method intervention design was used with a pre- and post-test quantitative model with an experimental intervention and qualitative data obtained after the intervention. Ten Hispanics, aged 63 and older, were enrolled in an eight weeks group intervention delivered by trained facilitators. Instruments to measure feasibility and pre/post participants' report outcomes of quality of life (Psychosocial Impact of Assistive Device Scale [PIADS] Short Form), global health (PROMIS General Health Short Form), self-efficacy (Self-efficacy Scale), and performance difficulties (Individualized Prioritized Problem Assessment [IPPA]) were used.

Results.—Recruitment, retention, and adherence rates were high, the intervention was acceptable, and the participants reported outcomes, such as: new knowledge and skills, enhanced activity performance and participation, increased safety and willingness to use AT, and trends in decreasing performance difficulties and enhancing quality of life.

Conclusion.—The intervention was feasible and acceptable and is promising in decreasing performance difficulties in daily activities as well as in having a positive impact in older Hispanics' quality of life.

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Disclosure statement

No potential conflict of interest was reported by the authors.

Keywords

self-help devices, frail elderly; Hispanics; independent living; activities of daily living; therapeutic use

Introduction

The Hispanic population, including Puerto Ricans, aged 65 and over is projected to quintuple between 2012 and 2050 [1]. With the aging of the population, an increase in disabilities is a public health matter of concern, since disabilities may lead to loss of independence, institutionalization, and early death [2]. Unfortunately, disabilities do not occur uniformly among racial and ethnic groups. Recent national data revealed that disparities in late life exist in the prevalence of independent living disabilities (defined as difficulty doing errands independently due to a physical, mental, or emotional condition) [3]. This is, Hispanics adults ages 65+ living in Puerto Rico have reported a much higher rate of independent living disabilities (28.8%) compared to non-Hispanic whites (13.9%), African American (18.9%), Native American or Alaska Native (21.3%), Asian (16.9%) and Hispanics (18.8%) ages 65+ living in living in the US (14.7%).

The use of low-tech assistive technology (AT) for the activities of daily living, such as jar openers, canes, elevated toilet seats, and reaching aids, are known cost-effective intervention that improves older adults' functionality and quality of life; thus, allowing older people to remain independent longer and delay their need for institutionalization [2]. In spite of the potential of AT to sustain older people independence, Hispanics, including Puerto Ricans, are reported among the least likely to use and access AT devices for the activities of daily living [4]. Furthermore, there is a gap in the literature about published reports on community-level AT interventions specifically designed for and tested among older Hispanics Puerto Ricans. It is well known that cultural factors, such as the set of values, beliefs systems, and language affect the adoption and use of AT [5]. Therefore, the lack of culturally-tailored AT interventions is believed to contribute, in part, to the existing disparities in disabilities reported among older Hispanics living in the unique context of Puerto Rico.

Barriers to successful use and adopt AT devices among older Puerto Ricans have been identify in a previous study [6]. Predominantly, these barriers included the lack of AT information and knowledge, financial limitations, safety concerns about AT use, perceived complexity of AT, AT device failure, unattractive appearance of AT, concerns of losing functional capacities, social stigma associated with AT use, and institutional system barriers such as lack of funding for AT, bureaucracy in the acquisition process, and lack of AT prescriptions by health care providers. To overcome theses barriers, we developed an evidence-based and culturally sensitive intervention for older Hispanics living in Puerto Rico with disabilities in independent living, named *Viviendo las Ventajas de la Asistencia Tecnológica* (VIVE-AT for short; Living the Advantages of Assistive Technologies in English) [7]. For the purpose of the intervention, AT is defined as the use of low-tech assistive devices, services, or strategies that decrease or eliminate performance difficulties in

the activities of daily living. VIVE-AT uses principles of self-management and behaviour change techniques to address the barriers reported in our previous study for using AT, including information provision and knowledge building, problem solving, decision-making, goal setting, monitoring, social support, and persuasive communication [8,9]. This article reports the feasibility study of the VIVE-AT intervention, and its results. The goal of VIVE-AT is to develop older Hispanics self-management skills to: 1) decrease performance difficulties in daily living activities and 2) improve quality of life. The aims of the current study were to assess if an AT self-management intervention (VIVE-AT) was feasible in terms of: (1) recruitment, retention, and adherence; (2) acceptability; (3) preliminary evaluation of participants' responses to intervention; and (4) preliminary data about the efficacy of the intervention.

Methodology

Study design

Using a mixed-method intervention design, we tested the feasibility of the VIVE-AT intervention (see Figure 1). Creswell states that the intent of the mixed-method intervention design is to study a problem by conducting an intervention and adding qualitative data before, during, or after the intervention [10]. Within this design, we used a pre- and post-test model with the experimental intervention (VIVE-AT) and added qualitative data after the intervention to test its feasibility. Combining quantitative and qualitative methods in a mixed method intervention study render better comprehensiveness and a richer understanding while addressing VIVE-AT's feasibility, specifically in areas such as: acceptability, participants' responses to the intervention, and the preliminary efficacy of the intervention's outcomes [11]. The institutional review board (IRB) of the Medical Sciences Campus University of Puerto Rico approved all study procedures.

Participants and recruitment procedures

We recruited a purposive sample of older adults participating in a multiple services senior center within a low-income community in San Juan. The inclusion criteria consisted of: (1) being of Hispanic ethnicity, 60 years or older, and participating in the selected senior center in San Juan; (2) Spanish speaking; (3) not receiving home care visits from institutions or others; (4) reported needing help or having difficulties with at least two daily instrumental activities or one daily living activities; (5) not having a severe cognitive impairment [as determined by obtaining a score of ≥ 12 in the Caban Mini Mental exam [12] ; and (6) willing to participate the required amount of time in the group interventions [two and a half hours, once a week, for two months]. Participants were excluded if they lived in a long-term, assisted care facility. These criteria were designed to select older adults who have experienced some difficulties with everyday activities, but who are not homebound, and/or reliant or receiving home rehabilitation services to address functional problems.

To begin the recruitment process, the director of the selected multiple services senior center contacted the center's participants and included potential candidates on a list. On a subsequent scheduled recruitment day at the center, researchers verified the listed candidates' interest in participating. If the potential participant agreed, the researchers met

with each individually at a private area to assess all inclusion criteria, except the examination for cognitive impairment. Having all other criteria met, the researchers explained the study's goal and expectations, and reassessed their willingness to participate to then offer a full explanation of the study. Informed consent was obtained in accordance with first author institutional review board's approval. Only after signing a consent form, was the Caban Mini Mental exam performed to assess the last inclusion criteria. Those that obtained a score of 12 were finally included in the study.

Data collection procedures

One week before the beginning of the intervention, recruited participants completed a socio-demographic questionnaire and the baseline measurements in one session of 40 minutes at the multiple services senior center. Socio-demographic data included participants' age, gender, educational levels, medical conditions, marital status, living status, employment status, annual income, source of income, health care plan, and assistive device use. Baseline measurements included the Individualized Prioritized Problem Assessment (IPPA) instrument [13] the Puerto Rican Version of the Psychosocial Impact of Assistive Device Scale (PR-PIADS) [14], the PROMIS Global Health Short Form [15], and the Self-efficacy Scale [16]. Baseline measurements were conducted individually, in a private room at the study site, by the researchers of this study. These occupational therapy researchers received an eight hours training by the principal investigator and demonstrated competency in the administration of this study's baseline measurements. Afterwards, the intervention group received eight weekly group sessions, for two and a half hours each, delivered over two successive months. One week following the final session, the participants completed the outcome measures in one session of approximately 50 minutes at the senior center.

VIVE-AT intervention

The VIVE-AT intervention emerged from two previous studies using a mixed methods design and with input from older adults and older adults services providers and experts living in Puerto Rico [6,7]. The VIVE-AT utilizes principles of self-management [8] and behavioural change techniques linked to the Theoretical Domain Framework [9] to decrease performance difficulties (disabilities) in activities of daily living. Table 1 describes the steps we used to choose the behaviour change techniques for the VIVE-AT intervention to overcome the main barriers for using AT found in our previous study [6] and the expected intervention outcomes associated with the behaviour change techniques. Key aspects of the intervention, including its crucial elements and modular content areas are detailed in table 2.

The VIVE-AT intervention included a Spanish partially scripted manual delivered by two occupational therapy master students to a recommended small group of 10 participants. The manual included a semi-structure format with open-ended questions to stimulate reflection and discussion of each content areas and handouts with instructional content supported by visual strategies to facilitate learning of participants with low-literacy levels. The manual also included discretionary activities selected by the participants to support a client-centered approach for developing specific skills for using AT, such as case studies, role playing, peer teaching, AT debates, and AT devices use competitions. Figure 2 presents a basic outline of one of the modules for a group session. The complete intervention included seven group

sessions of two and a half hours and one community outing, all held over eight weeks. The community outing is selected by the participants and has the objective to provide participants with the opportunity to practice the new learned skills. In this study, the participants selected to visit the local bowling club in which they had the opportunity to practice the use of the sock aid, the long handle shoehorn, and the variety of mobility devices.

During each session, the facilitators guide the participants to: (1) reflect on the impact of their disability to perform specific daily life activities; share any prior knowledge about AT to cope with disabilities; (3) identify barriers for using AT or an activity performance technique; (4) set goals to cope with disabilities; (5) develop skills for using AT; and (6) apply learned behaviours into their daily life routine. The facilitators were equipped with an easel pad to write the participants' relevant contributions, solutions to performance difficulties, and weekly goal setting for monitoring purpose. Common materials that accompanied the intervention included AT devices relevant to each module (borrowed from the Occupational Therapy Program of the Medical Sciences Campus University of Puerto Rico), participant pictorial handouts, and miscellaneous supplies (e.g., markers, paper, pens). Due to budgetary constraints, this study did not give the participants the AT devices that they needed.

Outcome measures

Recruitment, retention, adherence—The recruitment numbers were determined by tracking the number of subjects approached, those assessed for eligibility, those excluded based on the inclusion criteria, and those who declined to participate. The retention number was determined by tracking the number of subjects who discontinued the intervention during the study; information was also collected from their reasons given for discontinuation. Of the subjects that completed the VIVE-AT intervention, we tracked the amount of total sessions attended to determine adherence.

Acceptability—Acceptability was gauged using the *Participants' Assessment of the Intervention's Feasibility*, an instrument developed by the researchers specifically for this study and based on the empirical indicators of acceptability proposed by Sekhon, Cartwright and Francis [17]. This instrument contains 18 items that evaluate all aspects related to the intervention, such as: duration, activities, materials, usefulness, and facilitators. These items were measured on a 3-point Likert scale ranging from 1 (disagree) to 3 (agree).

Preliminary evaluation of participants' responses to intervention—The preliminary evaluation of participants' responses to intervention was assessed at the end of the VIVE-AT intervention through open-ended questions. These questions were administered to the participants using an interview format to assess the impact and perceived usefulness of the intervention. Sample questions were: *What was the most important thing that you learned from the intervention? How has this intervention helped you? What changes have you done because of your participation in this intervention?*

Preliminary data about efficacy—The preliminary data about efficacy of the VIVE-AT intervention was tested using the following patient-reported outcome measures administered at both timeframes: the baseline (one week before initiating the intervention) and post-intervention (one week after ending the intervention):

The Individualized Prioritized Problem Assessment (IPPA). The IPPA instrument evaluates the effectiveness of any kind of AT services [13]. It assesses the extent to which performance problems (dysfunction in activities of daily living) identified by the VIVE-AT participant have decreased at the end of the intervention. Each participant was asked to identify two performance problems in their daily life activities and then rate these problems according to the importance of the activity and its level of difficulty to perform on a scale ranging from 1 (not important / no difficulty) to 5 (most important / too difficult). A combined score calculation was used to determine the total IPPA score, which represents the total average perceived inconvenience experienced by the participant in regard to the identified problem associated with daily activities.

The Puerto Rican version of the Psychosocial Impact of Assistive Device Scale (PR-PIADS) Short Form. The PR-PIADS measures the expected impact on the participants' quality of life at baseline and the actual impact at the end of the VIVE-AT intervention. The PR-PIADS is a self-reported questionnaire (consisting of ten items) that has been validated to be culturally sensitive and a reliable instrument to evaluate the effects of an AT device or service on the users' quality of life, including dimensions of independence, adaptability, and competence [14,18]. The responses are measured using a scale ranging from -3 (maximum negative impact) to +3 (maximum positive impact).

The PROMIS® (Patient-Reported Outcomes Measurement Information System) General Health Short Form. The PROMIS Short Form gauges the general physical and mental health of the participants [15]. The PROMIS is a self-reported instrument with ten questions, and the responses are measured using a 5-point Likert scale ranging from 'excellent' to 'bad'.

Spanish version of the General Self-Efficacy Scale. This scale gauges the participants' general belief in their capacity to solve general problems and reach goals [16]. It consists of a 10-item questionnaire where responses are measured using a 4-point Likert scale ranging from 'totally disagree' to 'totally agree'. Juarez & Contreras demonstrated the scale's validity and reliability by indicating that it proved to be unidimensional with an explanatory factor of 41.41% and accurate with a Cronbach's Alpha of .83 [16].

Data analysis

Quantitative data—Descriptive statistics were used to analyze the participants' demographic data, recruitment/retention/adherence aspects, and the quantitative items of the Participants' Assessment of the Intervention's Feasibility questionnaire.

Qualitative data—A thematic analysis for qualitative data [19] was used to evaluate the responses obtained from the open-ended questions included in the *Participants' Assessment*

of the Intervention's Feasibility. One assistive technology researcher with 15 years of qualitative coding experience and six occupational therapy masters students with 1 year of qualitative coding experience, independently, conducted a detailed line-by-line analysis of the data to generate an initial coding scheme related to the intervention's impact. Then, all researchers met five times to compare the codes, discuss any discrepancies, reconcile contrary explanations, and sort the codes into major categories and sub-categories. These final categories were used to organize the codes into meaningful clusters. Triangulation of data analysis was conducted through peer debriefing to increase the trustworthiness of the gathered data [20]. This peer debriefing process also provided the means for identifying additional information and highlighted areas of disagreement and controversy. To support the coding process, the QSR International NVivo 11 qualitative data analysis software was used as a data manager and organizer. To assure trustworthiness, the quotes reported in this article were translated to English by a native Spanish speaking professional translator knowledgeable of the Puerto Rican culture. The credential and experience of the translator with the target population is important in the process of achieving a conceptually accurate translation of the concepts spoken by the study's participants [21].

Results

Participants' characteristics

The mean age of the participants at baseline was 74.4 (range=63-86 years). Most participants were: female (70%), had less than high school educational levels (60%), widowed (50%), lived with others (60%), retired (60%), received an annual income of less than \$5,000 (80%), had diverse medical conditions, such as arthritis (70%) and hypertension (50%), and used assistive devices, such as glasses (100%), pill organizers (60%), safety bars in the bathroom (50%), and walkers (40%; see table 3).

Recruitment, retention, and adherence

A total of 25 potentially eligible participants between the ages of 63 to 86 years were identified. Of these, we approached the first 12 (48%) participants that were available to evaluate for eligibility, in order to reach the number of participants (10-12) recommended for the group intervention in our previous study [7]. One participant was excluded due to evidence of cognitive impairment and another declined to participate. The remaining ten participants (83%) were found to be eligible and allocated to receive the intervention. After the third session of the intervention, one participant no longer attended because of a mental health crisis unrelated to the VIVE-AT intervention. Therefore, we retained nine participants (i.e., a retention rate of 90%) and all nine completed the post-tests (figure 3). Of the total eight sessions of the VIVE-AT intervention, the percent attended by these nine participants ranged from 56% to 100% with a mean of 85%, representing the participant's adherence to the intervention.

Acceptability

The nine participants who adhered to the intervention scored highly in all aspects of the intervention. In fact, 89% or more of the participants reported that the length of each intervention session was adequate, the activities delivered in the intervention facilitated their

safety and performance in daily tasks activities, and the facilitators were easy to understand during their presentations (table 4).

Preliminary evaluation of participants' responses to intervention

The participants' qualitative data obtained from their answers to the open-ended questions described how the VIVE-AT intervention impacted them. The responses were subdivided into four themes: 'new knowledge and skills', 'enhanced self-efficacy in activity performance and participation', 'increased safety', and 'increased willingness to use AT.'

New knowledge and skills.—Most participants reported gaining new knowledge and skills because of their participation in the intervention. Participants expressed learning about the use of the cane, sock aid, bottom hook, and 'reacher' AT devices. They also learned independent living strategies to enhance their performance in daily activities; as mentioned by the following participant:

What I've learned I have taken it to practice. Now I climb the stairs and get out of bed securely because I have fallen down many times. If I have lower back pain, I remember they (the facilitators) talked about putting a pillow under your knees (when laying on a bed).

Participants also reported having an increased awareness and use of AT devices previously owned and abandoned; as mentioned by another participant: *"I installed the toilet frame. I already had one, but my son installed it and now it's much easier (getting up from the toilet)."*

Enhanced self-efficacy in activity performance and participation.—Throughout the sessions, the observers noticed a change in the participants' perceptions about their own performance difficulties, and how the opportunity to use AT enhanced their performance and participation. For example, some participants initially stated that they would be unable to participate in the bowling activity due to their physical limitations. However, the observers, as well as fellow participants, witnessed how they were able to use the bowling ramp to engage, enjoy, and excel in this activity, as stated by one participant: *"Those that have more physical limitations tuned out to be the best ones of the game (bowling)."*

Increased safety.—An evident outcome of the VIVE-AT intervention was increased safety. The participants expressed many ways of how they applied the newly learned safety awareness strategies and skills during their daily life activities. For example, one woman answers to the question about the most important thing that she learned from the intervention was:

To get up from a chair I would do it insecurely; to get out of bed I also felt insecure. That technique (getting up from a low surface) helped me very much. Now I walk with more precaution, seeing the obstacles and removing them out of the way, because sometimes you know something is wrong, but you ignore it. What I mean is that it (the VIVE-AT program) helped me reflect before I do things.

This expression denotes how implementing a safer performance of activities also increased her self-efficacy in the performance of daily activities.

Increased willingness to use AT.—After the intervention, most participants reported interest in purchasing and using AT devices, such as the cervical pillow, the wedge pillow, the cane, the sock aid, and the ‘reacher’. In addition, most participants identified strategies and places to buy these AT devices, such as local pharmacies, department stores, and AT catalogs.

Preliminary data about efficacy testing

All tests completing pre and post-intervention ($n=9$) had mean (M) and standard deviations (SD) determined. A difference in mean values was observed with the IPPA scores between the pre-test for activity performance problem one ($M=16.8$, $SD=7.2$) and activity performance problem two ($M=16.4$, $SD=6.3$) and the post-test for activity performance problem one ($M=6.6$, $SD=3.6$) and activity performance problem two ($M=9.8$, $SD=7.3$). Given the small sample size, these values only reflect a declining trend in performance difficulties after the intervention. Common areas of difficulties identified by the participants in the IPPA included showering, putting on and taking off socks, getting up from the toilet, putting on pants, and cutting toenails. On the PR-PIADS pre-test, the participants rated the expected impact of the VIVE-AT intervention on their quality of life as high, with a $M=24.7$ and $SD=3.7$. Upon comparison to the PR-PIADS post-test, no noticeable difference was observed, with a $M=24.0$ and $SD=5.01$, reflecting a stable trend of a positive impact of the intervention in the participants quality of life. Regarding the PROMIS Global Health scores, a small difference was observed between the pre-test ($M=36.9$, $SD=4.6$) and post-test ($M=33.9$, $SD=4.7$) values, reflecting a small declining trend in global health. On the Self-Efficacy Scale, a small difference in the mean scores was observed between the pre-test ($M=34.2$, $SD=4.4$) and the post-test ($M=35.4$, $SD=5.8$), reflecting a small increasing trend in self-efficacy.

Discussion

The purpose of this study was to assess the feasibility of the VIVE-AT intervention, in terms of recruitment, retention, adherence, acceptability, preliminary evaluation of participants’ responses to intervention, and preliminary data about efficacy of VIVE-AT. Three main findings were evident. First, recruitment, retention, and adherence were high. Second, participants evaluated the intervention as acceptable. Third, the intervention showed a trend towards a positive impact in the participants’ quality of life, while decreasing their performance difficulty in activities of daily living.

Consistent with prior feasibility studies of community-based self-management interventions with older adults [22,23], this study also revealed high rates in recruitment, retention, and adherence. In addition, participants showed good acceptability of the VIVE-AT intervention. It is most likely that the participatory nature of the intervention and its focus on self-management skills and evidenced-based behavioural change techniques such as: problem solving, decision making, goal setting, and action planning contributed to high recruitment, retention, and adherence. Moreover, good acceptability of the intervention could be partially

explained by the participants' enjoyment, motivation, and engagement throughout the intervention and the use of active learning strategies within a group context. It is well known that allowing adults to become stakeholders in the training process by sharing control over content and methods lead to a greater motivation [24].

Regarding study outcomes, a trend towards reducing disability was observed after the VIVE-AT intervention, as measured by the presence of performance difficulties in daily living activities with the IPPA instrument. These findings are similar to other studies, which reflected an increased performance in daily life activities after an AT intervention [25,26]. However, in this study, the impact of the VIVE-AT intervention extended further into the subjects' daily activity participation (qualitative findings) and quality of life (as measured by the PIADS). It is well known that using AT devices may positively impact the user's quality of life [27,28]. Accordingly, the positive impact the VIVE-AT intervention had towards the use of both AT and independent living strategies, as seen in this study, assuredly resulted in a positive impact on the participants' quality of life. For the purpose of this study, the use of the IPPA and PR-PIADS instruments were assumed to be suitable measures to assess the efficacy of the VIVE-AT intervention.

Regarding the other instruments assessed in this study, small changes in global health (PROMIS Global Health Short Form) and self-efficacy (Self-Efficacy Scale) were actually incongruent with the participants' qualitative expressions of the intervention's positive impact on their ability to overcome their difficulties in daily activities. Lack of significant changes in global health and self-efficacy could be explained because they were done with a small sample size and the focuses of the measures were too general. General measures of health, while able to compare outcomes across different populations and interventions, lack sensitivity to certain disease-specific improvements. More specific measures of health may be more sensitive for the detection and quantification of small changes in participants [29,30]. Therefore, future studies must consider developing specific measures targeted to AT users that will assess the impact of AT interventions regarding self-efficacy, mental health, and physical health.

Study Limitations

We acknowledge there were several limitations in this study. Elderly Hispanics have a tendency to select extreme response categories when using a Likert scale, which could then affect the results of the efficacy measures [31]. We also recognize a bias risk from the occupational therapy graduate students conducting the outcome measures and facilitating the delivery of the VIVE-AT intervention. This bias limitation could be addressed by blinding the assessor to the participants' group allocation in future studies. Being a feasibility study, the study had insufficient power to evaluate the efficacy of the intervention and the results are considered descriptive rather than hypothesis testing. To duly detect significant changes in the VIVE-AT intervention outcomes, future randomized controlled trials should be conducted with sufficient power. Finally, this feasibility study design did not include long-term follow-up strategies in order to ascertain the effects of VIVE-AT towards the long-term AT use, functional performance, and participation.

Conclusion

The disability self-managed VIVE-AT intervention was shown to be feasible and acceptable to be delivered within a group-based structure in a community venue. The findings of this study provide initial evidence for the promise of VIVE-AT for decreasing performance difficulties in activities of daily living and having a positive impact in the quality of life of older Hispanics, if larger studies show similar results. This feasibility study is the first step towards examining the effectiveness of the intervention in a future randomized controlled trial.

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Figure 1.

Mixed method intervention design illustrating the pre-post-test model and the embedded qualitative data during and after the intervention. (VIVE-AT for short; Living the Advantages of Assistive Technologies in English).

Figure 2.
Sample session outline of an intervention module for a group meeting.

Figure 3.

Participant flow chart. Flow chart of participants recruitment, retention and adherence in the feasibility study of the Viviendo las Ventajas de la Asistencia Tecnológica (VIVE-AT for short; Living the Advantages of Assistive Technologies in English).

Table 1.

Description of the barriers for assistive technology use, the evidenced-based behaviour change techniques to overcome the barriers, and the expected outcomes of the VIVE-AT intervention

Main barriers for using assistive technologies	Behaviour change techniques that could overcome the modifiable barriers	Expected Outcomes
Lack of assistive technology information, knowledge, and skills	Information provision; Model/demonstrate the behaviour; Rehearsal of relevant skills; Problem solving, Decision making, Goal setting; Monitoring	Decrease performance difficulties; positive impact in quality of life; increase in self-efficacy; increase in global health
Unattractive appearance of the assistive technology devices	Information provision (AT with aesthetic designs); Social encouragement and support; Modeling the behaviour by other older participant; Persuasive communication; Motivational interviewing by facilitator	Positive impact in quality of life
Finance restrictions for assistive technology access	Information provision; Problem solving; Decision making; Goal setting; Monitoring	Decrease performance difficulties; positive impact in quality of life; increase in self-efficacy
Lack of institutional funding for assistive technology	Information provision (available resources and funding options in Puerto Rico); Problem solving; Decision making; Goal setting, Monitoring	Decrease performance difficulties; positive impact in quality of life; increase in self-efficacy
Social stigma associated with assistive technology use	Encouragement-positive feedback about AT use; Persuasive communication about the benefits and consequences of not using AT	Positive impact in quality of life

Table 2.

The VIVE-AT intervention key aspects

Key aspect	Description
Objective	To assists participants adopt behaviours and develop skills in using AT devices and independent living strategies to overcome their difficulties in activities of daily living
Responsible facilitators	<ul style="list-style-type: none"> ▶ Two occupational therapy masters students supervised by the principal investigator (occupational therapy researcher) ▶ Students completed 40 hours of training to standardize provision of the VIVE-AT intervention protocol in accord with the specification of the manual ▶ Students participated in weekly meetings with the principal investigator to ensure intervention fidelity and quality control
Intervention structure	<ul style="list-style-type: none"> ▶ Weekly 2 ½ hours small group sessions in the senior center or community venue - Group discussions, sharing experiences, instructional content with visual strategies, AT demonstrations and exploration, and practice with specific performance strategies and use of AT devices
Key elements of intervention	<ul style="list-style-type: none"> ▶ Self-reflection on performance difficulties and barriers for using AT ▶ Development of motivation for using AT ▶ Identification of relevant performance strategies (e.g. proper body mechanics for standing) and AT (e.g. seat lift) to overcome performance difficulties ▶ Development and implementation of plans to overcome performance difficulties ▶ Practice with selected performance strategies and AT devices; using selected performance strategies and AT devices in daily routine
Modular content areas	<ul style="list-style-type: none"> ▶ Week 1 - Introduction to daily living activities and AT ▶ Week 2 - AT for facilitating self-care, personal hygiene, and toilet use ▶ Week 3 - AT for facilitating home and community mobility ▶ Week 4 - Outing to a bowling club ▶ Week 5 - AT for facilitating dressing activities, rest and sleep ▶ Week 6 - AT for facilitating home access and safety ▶ Week 7 - AT funding, resources, and services providers ▶ Week 8 - Celebration of outcomes

Table 3.

Baseline socio-demographic data (n=10)

Demographic Variables	Values
Age, mean (range)	74.4 (63 – 86)
Gender, n (%)	
Female	7 (70%)
Male	3 (30%)
Education level:	
Less than high school	6 (60%)
Something higher than high school	2 (20%)
High school graduate	1 (10%)
University graduate	1 (10%)
Medical conditions: *	
Arthritis	7 (70%)
Hypertension	5 (50%)
Diabetes	4 (40%)
Visual condition	4 (40%)
Thyroid	4 (40%)
Cholesterol	3 (30%)
Osteoporosis	2 (20%)
Gastrointestinal condition	2 (20%)
Hearing condition	2 (20%)
Obesity	1 (10%)
Cardiac condition	1 (10%)
Respiratory condition (asthma)	1 (10%)
Diabetic neuropathy	1 (10%)
Marital status:	
Widower	5 (50%)
Divorced / separated	3 (30%)
Never married / single	2 (20%)
With how many people do you live?	
Alone	4 (40%)
One	3 (30%)
Two	2 (20%)
Three	1 (10%)
Employment status:	
Retired	6 (60%)
Housewife	2 (20%)
Unemployed	1 (10%)
Unable to work (disabled)	1 (10%)
Annual income:	
Less than \$5,000	8 (80%)

Demographic Variables	Values
\$5,000 – 11,999	1 (10%)
\$35,000 – 49,999	1 (10%)
Source of income: ⁻	
Social Security	9 (90%)
Retirement plan	3 (30%)
Nutritional assistance (PAN)	1 (10%)
Other (family member assistance)	1 (10%)
Health care plan:	
Medicare	6 (60%)
Government Plan (Reform)	3 (30%)
Private insurance	1 (10%)
Assistive technology devices they use: ⁺	
Glasses	10 (100%)
Pill organizer	6 (60%)
Safety bars in bathroom	5 (50%)
Walker	4 (40%)
Cane	3 (30%)
Reacher	3 (30%)
Manual wheelchair	2 (20%)
Opener of jars or pots	2 (20%)
Headphones	1 (10%)

* Most participants have more than one medical condition.

⁻ More than one source of income.

⁺ More than one assistive device.

Table 4.

Percentage acceptability of the program (n=9)

	Agree (%)	Neither agree nor disagree (%)	Disagree (%)
Duration of the intervention sessions was adequate (2.5 hours)	88.9	---	11.1
Duration of trip to bowling alley was adequate	66.7	---	22.2
Duration of the entire program (2 months) was adequate	88.9	---	11.1
Able to understand all the activities delivered in the program	77.9	22.2	---
It was easy for you to learn how assistive technology devices are used	100	---	---
Activities delivered during the program helped you to perform daily activities in an easier way.	100	---	---
Activities delivered helped you to increase your safety during daily tasks	100	---	---
Enjoyed the program	88.9	---	---
Facilitators were prepared	100	---	---
Facilitators were easy to understand during their presentations	100	---	---
The place where the program was delivered was comfortable	88.9	11.1	---
The materials used in the program were easy to read and understand	100	---	---
Were you interested during the program	100	---	---
Learning about AT and strategies to facilitate daily activities is important for you.	100	---	---
You can use the information you learned about assistive technology in your daily life	88.9	11.1	---
The program met your expectations	100	---	---
You would recommend this program to other seniors	100	---	---