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Research Paper

Evaluating the older adult experience of a web-based, tablet-delivered heart failure self-care program using gerontechnology principles

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ABSTRACT

The goals of gerontechnology are to develop technology that facilitates goal attainment and improves satisfaction with life for older adults. Few mHealth technology systems have been evaluated using these criteria. The purpose of this paper was to present the qualitative analysis of participant post-intervention interviews from the tablet-delivered *Penn State Heart Assistant* intervention. Semi-structured interviews ($n = 12$) were conducted after the completion of a 30 day study protocol. Interviews were transcribed verbatim by a professional transcriptionist, then analyzed using an iterative process of coding, categorization, and thematic development using DeDoose software and a gerontechnology interpretive lens. Two themes with six *subthemes* arose: Benefits – *information sharing with others, usability and learnability, use of help resources;* Suggestions – *continuing use after the study, technical problems, participant suggested improvements.* Interviews suggested improved goal attainment and satisfaction with life for the older adults with use of the tablet.

Introduction

Geriatric nurses are increasingly confronted with both *patient use* of mHealth technology such as web portals and hand held devices as well as *patient feedback* on difficulties experienced with this technology. While the National Health and Aging Trends Study found that 40% of Medicare beneficiaries used e-mail or text messaging and almost 43% used the internet, many patients experience difficulties related to ease of use or familiarity with certain types of technology.[1] Gerontechnology brings together two separate fields of study – demography and technology – with the stated goal of developing technology that facilitates goal attainment and improves life satisfaction for older adults.[2] Using gerontechnology principles to develop new mHealth technology should result in fewer difficulties for older adults using new technology.

Over 5 million people in the United States have heart failure (HF), the majority of which are older adults.[3] Advances in mechanical circulatory support devices and treatment regimens continue to increase the likelihood that individuals who are hospitalized with HF will recover sufficiently to be discharged home.[4] However, more than 25% of these individuals will be re-hospitalized within 30 days[5] and 50% will be readmitted within the first six months after discharge.[4,6] Many of these unplanned readmissions are related to failures in self-care regimens at home.[6,7] mHealth technology offers new approaches to improve individuals' self-care through self-tracking and increasing patient empowerment in cost effective ways.[8] Our team is engaged in developing technology to improve self-care which hopefully will allow older adults with HF to be safely managed in the community.

Current HF technology studies have identified significant problems with effectiveness and broad implementation[9,10]

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suggesting the need for older adults to participate with technology designers earlier in the testing phase. However, to date, there has been relatively little report of participant feedback, on the technology itself, early in HF mHealth technology trials. When interviews have been conducted, participants have been asked about satisfaction with the technology or care delivery,[11,12] rather than being more broadly assessed to provide meaningful and specific feedback early in the development phase on their experience of the technology as currently designed and what changes they would like to see in the technology before future use. The purpose of this paper was to fill this gap by presenting the qualitative analysis of participant post-intervention interviews with older adults from the tablet-delivered *Penn State Heart Assistant* (PSHA) mHealth intervention using a gerontechnology interpretive lens. A gerontechnology interpretive lens involves the examination of the text for statements related to goal attainment or life satisfaction.

Method

Design

A proof of concept trial involving the PSHA was conducted with 12 older adults to assess participants' experience and response to the technology, as well as elicit suggestions for improvement. The quantitative data is reported elsewhere.[13] All participants were interviewed at the end of a 30 day trial with the PSHA.

Participants

Participants were recruited from a large, academic medical center in the mid-Atlantic region of the United States after Institutional Review Board approval of the protocol. Inclusion criteria: adults, alert and oriented, documented New York Heart Association class II–III HF in the electronic health record, currently hospitalized with a HF related admission, reliable home wireless internet access, English speaking and willing and able to participate. Exclusion criteria: children, chronic cognitive impairment documented in the electronic health record, dialysis patients, discharge disposition to a skilled facility, and New York Heart Association class IV or weight greater than 300 lbs (due to the exercise component). Screening was completed by a HF nurse practitioner (SB) and cardiologist (AF) on a daily basis over a three month period. Once deemed appropriate for the study, the HF nurse practitioner approached potential participants in the hospital one to two days before their expected discharge. The study was explained, tablet use demonstrated, and a brief introductory video was shown which outlined daily expectations for participants in the project. Potential participants were then consented if they expressed interest in participating and met inclusion criteria.

Intervention

The PSHA is a web-based, tablet delivered intervention, developed by our team, which encourages the participant to record their daily medication intake, weight and time spent with a brief exercise program using an aerobic stepper. Consented participants were contacted by trained research assistants (RAs) between 24 and 48 h after hospital discharge and an appointment was set up to deliver the PSHA tablet to their homes. The RAs reviewed a simple instruction manual, which included screenshots of the tablet, with the participants and then provided a phone number where they could be reached with any questions. Participants used the individualized tablet each day to record their information and to voluntarily view one short heart health educational video about HF causes and symptoms. After uploading the information to a secure server, the program created graphs that allowed the participant to visually track their information. The intervention lasted thirty days.

Data collection

The RAs received training from a qualitative expert on the study team (HB) prior to conducting the post-intervention interviews. A training manual was provided which included an opening script and a semi-structured interview guide. An example of a question in the interview guide was, "Did seeing your information change anything in what you thought about your heart or what you did in taking care of it?" If the participant answered "yes" the RA was instructed to follow up with, "What changed?"; if the participant answered "no" the RA was instructed to follow up with, "What would have helped you?" (see Supplemental material for full Interview Guide). Participants were interviewed at their earliest convenience (range 1–7 days) after completion of the protocol to assess their experiences with the technology including likes, dislikes, barriers to use, and suggestions for improvement. All interviews with audiorecorded with a digital recorder and then transcribed verbatim by a trained transcriptionist. The credibility of the study was enhanced by training in qualitative interview techniques by an expert, use of semi-structured interview guideline and field notes by the RAs, professional transcription and use of analysis tool, and analytic notes by the team during group analytic sessions. The 12 interviews ranged from 7.39 to 23.53 min per interview with an average interview lasting 14 min. There were a total of 168 min of interview data for analysis.

Data analysis

Interview transcripts were managed using Dedoose, a web-based qualitative analysis tool.[14] The general inductive approach outlined in Thomas[15] combined with the coding approach discussed in Saldana[16] was used initially to conduct the analysis of the interview transcripts. This resulted in five steps: 1) initial reading of text data; 2) identify specific text segments related to objectives; 3) label the segments of text to create categories; 4) reduce overlap and redundancy among the categories; 5) create a table incorporating most important categories.[15] Subsequently a gerontechnology lens was used in the interpretations of the findings; we carefully examined any text that suggested goal attainment or life satisfaction. Two team members (AP, EP) conducted the initial analysis which was then reviewed with further analysis by the full team. Any disagreement during the analytic process was resolved with iterative discussions and review of the literature. Trustworthiness of the findings are supported by the involvement of at least two team members at each stage of data analysis and use of an audit trail of process and analytic memos.

Results

The average participant was a 65 year old married, college educated male (Table 1). Six of the nine participants who provided information about their technical ability stated that they were familiar with the tablet or technically literate.

Analysis of the narratives resulted in two themes arising: theme 1: *Benefits from current use* which included the sub-themes – information sharing with others, usability and learnability, use of help resources; and theme 2: *Suggestions for future use* included the sub-themes – continuing use after the study, technical problems, participant suggested improvements.