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Geriatric Nursing

journal homepage: www.gnjournal.com

NGNA Section

Acceptability and usability of a telepresence robot for geriatric primary care: A pilot

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A B S T R A C T

Keywords:

Older adult

Remote presence robot

Primary care

The dual challenge of increasing numbers of older adults and overall increases in those with some form of insurance is driving the need to develop and evaluate novel methods of primary care delivery such as telehealth. The goal of this study was to explore the acceptability and usability of a remote presence robot (RPR) in a simulated primary care wellness encounter for older adults. A descriptive exploratory study was used to determine the acceptability and usability of the RPR operated by an APRN 250 miles from 13 older adults residing in a high rise during a simulated primary care visit. The results support previous research that technology such as the RPR can be both acceptable and useful for an older adult and primary care provider but only in certain circumstances.

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Background

Since Jan 1, 2011 approximately 10,000 Americans a day have turned 65 and become Medicare eligible.¹ This rate will continue for another 15 years further swelling the ranks of Medicare and pressuring an already limited supply of primary care health workers.² Primary care is further burdened with the expanded insurance coverage of the Affordable Care Act and expansion of Medicaid. The dual challenge of increasing numbers of older adults and overall increases in those with some form of insurance is driving the need to develop and evaluate novel methods of primary care delivery such as telehealth.

Telehealth is “the use of technology and communication media such as computers, telephones, live video streaming, and tele-monitoring equipment to enable health care service delivery.”³ Telehealth, telemedicine and similar terms are used to describe a wide variety of technological devices for remote monitoring and communication for patients with their health care providers.^{4,5}

Telehealth technology has been used in a variety of care settings with patients and providers to increase accessibility, communication and social interactions.^{6,7} Studies are mixed regarding the cost reductions produced by telehealth but there is some evidence that time savings, elimination of travel expenses and fewer hospitalizations do at least justify the technology.^{3,8} In a review of 80 telemedicine reviews, only 25% concluded telemedicine effective and 23% found telemedicine “promising” at best.⁹ The authors concluded much more research is needed in this rapidly evolving field, and should include the patient perspective (acceptability) and effectiveness (usability) for patients and their providers.^{4,7–10}

Research concerning telehealth acceptability and usability for older patients has also focused on a variety of settings and included communication between the older patient and providers.^{5,11} Synchronous or real-time communication is preferred by older adults over asynchronous communication.⁵ Real time communication, also termed telepresence can be provided by either a static or mobile system. A static device is fixed in place (teleconference, phone), a mobile device is robotically controlled by the provider and can move within the physical space of the older adult. Both systems of telepresence have been used with older adults for social assistance and/or health care communication.^{6,12}

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Health care communication via RPR promotes a real-time versatile interactive experience between the older adult and provider. The RPR was found acceptable in a few small studies of older adults at home, a nursing home or acute care setting.^{6,12} Older adults indicated that RPR can improve communication between themselves and their providers, and could help shift the focus of care from hospital to home-based care.¹³ Research on acceptability among health care providers for the RPR is inconsistent and nonexistent for advanced practice nurses. In one study of health professions students were concerned the technology would replace them and generally not found acceptable.^{9,14}

The most consistent criticism of the usability of RPR by both providers and older adults concern the maneuverability of the robot. They note it can be difficult to provide enough open space for RPR movement in either the home or clinical settings.^{12,15} Other usability concerns include the angle of visibility and the ability to clean/disinfect the RPR after patient contact.¹⁵ No studies were found examining the RPR use in a primary care setting for older adults.

The goal of this study was to explore the acceptability and usability of the RPR in a simulated primary care wellness encounter for older adults. The specific aims were to: (1) describe acceptability in terms of reaction and satisfaction using a Likert-type scale and positive/negative comments (2) describe usability in terms of usefulness and effectiveness using a Likert-type scale, positive/negative comments, and five open-ended items concerning RPR features liked, suggested improvements, and safety/ergonomic issues.

Method

Design, setting and sample

This was a descriptive exploratory study to determine the acceptability and usability of the telepresence robot in a simulated primary care wellness visit for independent living older adults. The setting was a wellness clinic in one of the independent living buildings on the campus of a large (over 800 residents) not for profit, faith based continuing care retirement community (CCRC) in south central Ohio. The wellness clinic on the first floor of the apartment building contains a reception area and suite of rooms with an in-take area and two examination rooms. The clinic is wheel-chair accessible and staffed with Registered Nurses or other providers (e.g., a podiatrist) five days a week who see apartment residents for non-urgent primary nursing or medical care. All residents have a primary care provider outside the CCRC but can access the clinic for such things as assistance with eye drops or blood pressure monitoring. Staff work with the CCRC Medical Director and other providers as needed.

The apartment building used in this study has 100 apartments with residents who live independently and qualify for Medicare and/or Medicaid health insurance. After receiving approval from the IRB, agency Medical Director, administration, and clinic staff, an IRB approved letter of invitation was sent by the building management to all building residents explaining the study and providing contact information for a research staff member. Interested residents contacted the research staff member to arrange a face to face meeting to determine eligibility, answer questions, sign the consent form and then make an appointment for the simulated wellness visit. Eligible residents needed to be capable of reading and signing the consent form independently, stating in their own words the purpose of the study, getting to the simulated wellness appointment independently, and capable of standing, using a self-inflating blood pressure cuff, thermometer and holding a stethoscope head as directed verbally. Thirteen residents contacted the research staff member, met the inclusion criteria and were included. This

convenience sample included both men and women, all over age 65. All participants completed all components of the study.

The remote presence robot

The RPR used in this study consisted of an RP-7™ robot manufactured by InTouch Technologies, Inc., a dedicated laptop control station with joystick for moving the robot, headset for communication, the robot itself with stethoscope, battery and wall charger, and the training/support personal for these pieces of equipment (Fig. 1). The robotic mechanisms allow the operator to converse with a patient and to see, hear, and listen to various parts of the human body. The sensory exchange is done through the computer control station, wide angle and zoom cameras, audio and phone connection, and a stethoscope that connects directly to the robot. The RP-7™ is approved by the Federal Drug Administration (FDA) and is Health Insurance Portability and Accountability Act (HIPAA) compliant.

The RPR has been found easy to use and compatible with high speed wireless internet connections at acute care hospitals across the globe.^{12,15,16} The RPR acceptance and functionality have not resulted in any unfavorable outcomes to date. The nurse practitioner in this study was trained to operate the RP-7™ and had one other experience in its operation for educational research purposes.¹⁷ The APRN was physically located about 250 miles from the clinic site and operated the RPR over a standard high speed internet connection.

The RPR was kept in the wellness clinic connected to a power outlet when not in use. Prior to the start of data collection and after IRB approval, clinic staff were introduced to the RPR and trial runs made of the study protocol. No “dead spots” were identified within the clinic nor any physical obstructions encountered as the nurse practitioner moved the robot between the reception, in-take and exam room areas. No assistance from staff was required except to verify that the RPR was reconnected to the wall outlet at the conclusion of the day.



Fig. 1. RPR operated by the author and working with volunteer resident not in the study.

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