



Feature Article

Acceptability of wristband activity trackers among community dwelling older adults



Tara O'Brien, PhD, RN, CNE^{a,*}, Meredith Troutman-Jordan, PhD, RN^b,
Donna Hathaway, PhD, RN, FAAN^a, Shannon Armstrong, BSN, RN^b,
Michael Moore, PhD^b

^a University of Tennessee Health Science Center's College of Nursing, 920 Madison Building, Memphis, TN 38163, USA

^b School of Nursing, University of North Carolina at Charlotte, 9201 University City Blvd, Charlotte, NC 28223, USA

ABSTRACT

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Wristband activity trackers have become widely used among young adults. However, few studies have explored their use for monitoring and improving health outcomes among older adults. The purpose of this study was to evaluate the feasibility and utility of activity tracker use among older adults for monitoring activity, improving self-efficacy, and health outcomes. A 12-week pilot study was conducted to evaluate the feasibility and utility of mobile wristband activity trackers. The sample ($N = 34$) was 65% women 73.5 ± 9.4 years of age who had a high school diploma or GED (38%) and reported an income $\leq \$35,000$ (58%). Participants completing the study (95%) experienced a decrease in waist circumference ($p > 0.009$), however no change in self-efficacy. Participants found activity trackers easy to use which contributed to minimal study withdrawals. It was concluded that activity trackers could be useful for monitoring and promoting physical activity and improving older adults' health.

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Introduction

Participation in physical activity is often associated with young rather than older people. According to the Centers for Disease Control,¹ 80% of older adults living in the United States (US) do not engage in the recommended daily amount of exercise. The lack of physical activity among older adults has been associated with higher rates of cancer, stroke, cardiovascular disease, diabetes, obesity, and Alzheimer's disease.² Interventions that enhance self-efficacy for older adults' ability to participate in regular physical activity are greatly needed to lessen the personal, social, and economic impacts of chronic disease.

Americans living in the southern region of the United States are less likely to participate in regular physical activity compared to people living in other regions of the US.¹ In North Carolina (NC), for example, only 46.4% of older adults meet the current daily physical activity recommendations (30 min of exercise per day).³ This lack of physical activity has been linked to cardiovascular disease among NC residents (CDC, 2013) which is the most costly and preventable cause of morbidity and mortality for older adults in the state.⁴

Simple low impact physical activity, such as walking, is particularly beneficial for older adults.⁵ Although the literature indicates that accelerometers (wearable devices that measure physical activity) have been widely accepted and proven useful for increasing activity among young adults⁶ these findings are not conclusive for older adults. Some studies have found older adults to be more aware of their physical activity levels when wearing a pedometer.⁷ However, other studies have found barriers with the use of traditional pedometers; including, becoming detached from clothing, loss of the pedometer, improper stride length measurement, and inaccurate recording of information.⁸ There is some evidence, however, that measurement of physical activity may help increase physical activity among older individuals at least when combined with additional Internet guided activity planning and tracking.⁹ For example, older adults randomized to treatment

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* Corresponding author. The University of Tennessee Health Science Center, College of Nursing, 9201 University City Boulevard, Memphis, TN 38163, USA. Tel.: +1 901 448 1176.

E-mail address: tobrien5@uthsc.edu (T. O'Brien).

using a combination of an accelerometer and an Internet physical activity planning/tracking mechanism averaged 764 more steps per day than the usual care group which was given only a pedometer.⁹

There is also some growing evidence that older adults benefit from exposure to websites to deliver computer-tailored physical activity interventions.¹⁰ Specifically, this study found that the older adults actually engaged in more total physical activity minutes and more total physical activity sessions than those in younger age groups. These findings suggest that monitoring of activity can be appropriate for older aged adults and may help increase time spent in physical activity and that it may be particularly beneficial to combine this with additional Internet or web-based interventions.

Many older adults, particularly those residing in rural areas, may not have access to the Internet. From a practical perspective it may be useful, therefore, to combine an educational program in conjunction with accelerometer activity tracker to strengthen health self-efficacy, physical activity and improve health outcomes. The overall aim of this pilot study was to evaluate the feasibility and utility of wristband activity tracker use, in combination of weekly health education sessions among adults ≥ 60 years old living in the southern United States.

Theoretical framework

Social Cognitive Theory (SCT) provided the theoretical framework for this pilot study, as behavioral change is required in order to increase physical activity.¹¹ Based on Social Cognitive Theory it is anticipated that individuals become motivated and guide their actions through their beliefs and self-efficacy. The concept of perceived self-efficacy, with regard to physical activity, plays a key role in the older adult's expectation of setting personal goals to engage in physical activity behaviors that promote daily exercise. In addition to setting goals to promote exercise, individuals need informative feedback on their exercise behaviors to allow them to perfect their skills or routines.¹² The objective of combining an educational intervention with wristband activity tracker is to provide information that will encourage goal-setting and to subsequently provide immediate informative feedback about the number of steps taken each day. The goal of this immediate feedback, pertaining to daily steps, is to increase self-efficacy for physical activity.^{12–14}

Material and methods

Design

This pilot study was set within the Eat Better Move More (EBMM) parent study which was examining the efficacy of nutritional and exercise interventions designed for older adults. The EBMM program was developed by the Older Americans Act (OAA) and the Administration on Aging National, You Can! Campaign.¹⁵ This EBMM program included 12 weekly mini-talks focused on skills designed to change nutrition and physical activity behaviors for individuals randomized to either a pedometer or a mobile activity wristband tracker.

The purpose of this study was to establish the feasibility and utility of the mobile activity wristband tracker as used during the 12 week study period. Specifically, we evaluated the: a) rate of agreement to use activity trackers, b) ability of participants to physically and cognitively use the activity trackers correctly, and c) the willingness to the activity trackers for a 12-week duration of time. To address utility, we evaluated if the use of the wristband activity trackers influenced, a) physical activity self-efficacy, b)

physical activity, and, c) health outcome measures [blood pressure, heart rate, Time Up and Go test (TUG), waist circumference (WC) and body mass index (BMI)]. A University based Institutional Review Board approval this study.

Setting and sample

A convenience sample of older adult men and women was recruited over a 2 week period from a rural senior center in North Carolina during the winter of 2013. Flyers were posted at the senior center to specifically recruit participants for the mobile activity wristband tracker group for the EBMM pilot study.

Inclusion criteria included: a) age 60 or older, b) ability to travel to the study site, c) participating in the EBMM program, and d) ability to participate in physical activity per the Physical Activity Screening Questionnaire (PASQ).¹⁶ Participants were excluded from the EBMM mobile activity wristband tracker study for the following reasons: (a) cognitive memory impairment which was based on the ability to recall at least 1/3 word recall and complete the Clock Drawing on the Mini-cog,¹⁷ (b) under age 60, (c) unable to travel to the study site, (d) actively participating in a weight loss program, and (e) planning to move out of the county within the next 12 weeks. Thirty eight participants were approached about participating in the EBMM mobile activity wristband tracker study. Of the 38 participants, two declined the opportunity to be in the study. From the remaining 36 participants, 2 participants were excluded due to age (younger than age 60) and the inability to read.

Intervention

As part of the EBMM mobile activity wristband tracker study, each participant was given a Nike Fuel[®] wristband activity tracker¹⁸ which was a slim wristband worn similar to a watch on the non-dominant wrist for 24 h a day. The Nike Fuel wristband measures a person's steps based on arm movement. Participants wore the Nike Fuel wristband daily for 12-weeks. The participants were given a week of training on how to use the activity tracker to record steps taken each day. During the week of training, information was provided on how to access the daily steps and calories burned from the participant's wristband digital screen. Because many of the participants did not have access to a computer or a smartphone, they were given a Tips and Tasks sheet, on which they were to document the total steps taken and calories burned at the end of each day. Further they were instructed to bring the weekly Tips and Tasks sheet written record to the senior center each week at which time the research team reviewed the data with the participant for accuracy and completeness prior to recording it into the database.

In addition, as part of the EBMM program, all participants were exposed to a 45 min weekly session about strategies to change nutrition and physical activity behaviors. A total of 12 weekly modules were provided to the participants pertaining to the following topics: a) fruits and vegetables b) calcium rich foods, c) fiber rich foods, d) portions sizes, e) tips for stretching, f) proper fitting shoes, g) walking safety, and h) maintaining good posture. In addition, a 30 min group walking session was led by research assistants for the entire group each week.

Measures

Demographic information was obtained during a baseline face-to-face survey and included: gender, race, marital status, income and education. A health history related to 15 specific conditions was also taken. All other measures were obtained at baseline and at 12 weeks, except for steps taken and calories burned.

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