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## Screening of Physical Activity Levels in Older Adults at a Community-Based Health Fair: A Feasibility Study

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## INTRODUCTION

The Centers for Disease Control and Prevention (CDC) reports that the population of those 65 years of age and older will double to 72 million in the next 20 years, and in the next twelve years they will comprise approximately 20% of the population.[1] The CDC reports that in 2015, over 67% of those over 65 years enrolled in Medicare had two or more chronic health conditions.[2] There is a large financial cost in treating this part of the American population, with the government spending 71% of healthcare budget to treat those with two or more chronic conditions. [3]

Physical activity improves the health and functional mobility in adults including those with chronic conditions.[4] Physical activity also improves strength, cardiopulmonary function, postural stability, mental health,[5] and functional strength and gait speed.[6] Increasing exercise levels has been shown to reduce the rate of falls.[7] However, in 2016, 56.7% of those over 65 years did not meet either muscle-strengthening or aerobic activity guidelines set forth in the 2008 Physical Activity Guidelines for Americans, and only 12.7% met both. Of those 75 years of age and over, this number climbs to 65.4% not meeting either, and 8.7 meeting both.[8]

Health fairs are a way to motivate community members to seek care for hypertension;[9] student-led health fairs result in improved disease knowledge and intent to follow up with the provider,[10] and improve health knowledge.[11] Physical therapists are healthcare professionals who can help “reduce pain and improve or restore mobility.”[12] Screenings and education by physical therapists at health fairs encourages behaviors for healthy living and fall risk reduction in an older adult population.[13] Similarly, physical therapists could easily integrate screening for decreased levels of physical activity at community-based health fairs. However, we did not find any research in the literature regarding screening levels of physical activity among older adults at health fairs. As physical therapists focus on physical mobility and activity, and physical activity

can improve health and function, physical therapists are ideally suited to screen for levels of physical activity and fall history, and to provide consultations at community health fairs. Identification of adults at risk for falls due to decreased activity levels may lead to early interventions, thereby increasing chances of improved health, functional mobility and community participation.

The purpose of this study was to determine the feasibility of screening physical activity levels of participants in a community-based health fair, using excerpted physical activity items from the National Health and Nutrition Examination Survey (NHANES).[14] We also explored relationships between the sociodemographic, health-related factors and self-reported physical activity level in a group of community-dwelling older adults, who participated in the health fair.

## METHODS

### PARTICIPANTS

Thirty-seven community-dwelling seniors, who were assessed at the Physical Therapy booth at the Senior Smiles and Wellness Health Fair, hosted by the Arthur A. Dugoni School of Dentistry at University of the Pacific in San Francisco, California on a Saturday in April 2018.

### DESIGN

This was a retrospective study based on the data that was collected as part of the physical therapy health screen provided at a community health fair.

### PROCEDURE

Community-dwelling seniors (age > 65 years) primarily from San Francisco and surrounding communities participated in the annual Senior Smiles and Wellness Health Fair. The Fair organizers recruited participants by word of mouth and advertisements for the health fair with the

goal of supporting healthy behavior and health changes in Bay Area seniors. The participants registered on arrival and were provided a range of health screening services, including dental evaluations provided by Dental College students, cholesterol and blood pressure screening, blood glucose monitoring, medication consultations, bone mineral density screening, screening for anemia, and lifestyle education provided by Pharmacy students, hearing checks provided by the Audiology students, and fall risk screens and education provided by Doctor of Physical Therapy (DPT) students. Guides directed participants to each screening station. Different rooms housed different screening stations, and participants often used the hallways as a waiting area. DPT students conducted balance and physical activity screens in a room of about 70 sq. meters. Faculty advisors trained all participating DPT students to administer the screening tests prior to the health fair.

#### OUTCOME MEASURES

Participants completed a questionnaire, which recorded:

- Demographic information including participants' height, weight, age, and occupation status (hours per day if working); information on gender was inadvertently left off of this questionnaire;
- Self-reported history of vision, hearing, or sleep problems;
- Self-reported symptoms of dizziness in the past 24 hours, of any pain (rating and location), numbness or tingling in feet or toes;
- Self-reported number of falls in the last year, use of an assistive device for ambulation; and
- Self-reported health history (any serious medical or surgical history), any blood pressure medication.

*Balance Confidence:* Subjective measure of confidence in performing various ambulatory activities without falling or experiencing a sense of unsteadiness was collected using the Activity-specific Balance Confidence (ABC) scale.[15] The ABC can assess level of physical function [16] as well as risk of falls.[17] If the participant is unable to complete the ABC, another person can administer it. The 16-item scale asks participant how confident they are in not losing their balance or being unsteady when performing an activity, with an 11-point rating system in whole numbers of 0% being no confidence to 100% being completely confident. Activities range from walking around the house to walking outside on icy sidewalks.

*Physical activity:* General activity level was determined by asking participants their current exercise levels and any difficulties with walking or balance. Additionally, Physical Activity Level (PAL) items from the NHANES were administered to get details of the physical activity of the participants. NHANES is designed “to assess the health and nutritional status of adults and children in the United States” and includes a questionnaire to assess Physical Activity Level. For this study we used an excerpt of the NHANES PAL questionnaire to assess physical activity level (Appendix 1).

#### FEASIBILITY ASSESSMENT

Feasibility was assessed by time required to conduct screenings and ease of integrating the screening questionnaires into the health fair workflow. Participants’ self-reported responses were collected by Doctor of Physical Therapy (DPT) students. Perceptions and experience of DPT students was collected after the health fair during an hour-long debriefing session. Assessment of the collected responses at the health fair and the students’ experience was approved by institutional review board.

#### STATISTICAL ANALYSIS

Continuous outcome measures were expressed as means and 95% confidence intervals (95%CI). Continuous variables were assessed for departure from normality using the Shapiro-Wilk test. Shapiro-Wilk testing revealed no significant departure from normality for continuous variables ( $p > .05$ ), so parametric statistical tests were used. Specifically, significance of differences between relevant participant subgroups was determined using one-way analysis of variance (ANOVA). Binomial outcomes measures were expressed as counts and percentages. Odds ratios were used to assess the strength of association between binomial variables, and Pearson chi-square testing was used to determine the statistical significance of observed associations. Statistical significance of observed differences and associations was considered at  $\alpha \leq .05$ .

## RESULTS

Data of 37 community-dwelling older adults was available for analysis (Table 1). Mean age of the cohort was 71.5 years (95%CI: 71.0, 72.0).

*Balance.* Mean ABC score for the cohort was 74.7 (95%CI: 73.4, 76.0) (Table 2), including seven (18.9%) with low ABC (score:  $<49$ ), 12 (32.4%) with moderate ABC (score: 50-80), and 19 (51.4%) with high ABC (score:  $>80$ ). Participants reported a mean of 4.8 known fall risk factors related to medical and fall history (95%CI: 3.9-5.7). ABC score was significantly less for participants reporting vision impairment ( $p < .01$ ), sleep disturbance ( $p < .01$ ), dizziness ( $p = .001$ ), history of a fall in the previous year ( $p < .05$ ), toe and foot numbness ( $p < .01$ ), and use of a gait assistive device ( $p = .001$ ).

*Physical activity.* Responses to the NHANES survey are recorded in Table 2. Twenty-four participants were physical active more than 2 days per week (64.9%). Twenty participants (54.1%) met the weekly cumulative recommendation for moderate-to-vigorous physical activity (MVPA)

time. Five participants met the weekly cumulative recommendation for vigorous physical activity (VPA) time (13.5%). Eighteen participants reported more than 2 hours of sedentary time each day (47.3%), including 16 participants reporting greater than 1 hour using the computer/video games (43.2%). The presence of self-reported hearing problems significantly predicted being physically active two or more times weekly (Odds ratio: 10.7, 95%CI: 1.1-109.8,  $p < .05$ ). Neither balance confidence nor the fall risk factors measured in this project significantly predicted achievement of the weekly cumulative MVPA time, daily MVPA time, weekly cumulative VPA time, and daily VPA time. However, individuals with hearing problems reported fewer days active for 1 hour or greater ( $p < .01$ ; Table 3). Individuals reporting pain and pain affecting the low back or lower extremities reported significantly fewer hours of vigorous physical activity on a typical day than individuals who did not report pain ( $p < .01$ ) and pain affecting the low back or lower extremities ( $p < .05$ ; Table 3). People who reported use of a gait aid and anti-hypertensive medications were more likely to report meeting cumulative MVPA recommendations than people who did not report using a gait aid and anti-hypertensive medications ( $p < .05$ ). Self-reported pain was associated with significantly decreased frequency of meeting weekly cumulative VPA recommendations ( $p < .05$ ).

*Feasibility of screening physical activity levels at the health fair:* No additional costs were incurred for including physical activity screening questionnaires. Seven additional DPT students were recruited as compared to previous years, to help with the screening questionnaires. All the DPT students required two extra hours of training with the screening tests prior to the health fair. The total time spent with each English-speaking participant went up by about 15-20 minutes, while for the non-English-speaking participants was up by more than 30 minutes with interpreter support to complete the questionnaires. Additionally, with more students testing, there was increased activity and increased participants in the space, creating challenges for efficient testing and for

hearing with the increased noise. Increased time for the screening tests and less space led to back-up in the waiting lines.

## DISCUSSION

The purpose of this study was to determine the feasibility of screening physical activity levels of participants in a community-based health fair, using PAL from the NHANES. Although the study was designed as a pilot/feasibility study for inclusion of new questionnaire, we also explored relationships between the sociodemographic, health-related factors and self-reported physical activity level data that was collected.

Overall, DPT students perceived the inclusion of physical activity level screening in health fairs as acceptable and feasible. In this study, we examined physical activity levels in an inclusive community-based health fair. Health fairs attract adults across many sociodemographic and health-related characteristics. Thus, health fairs may be ideal avenues to screen and provide health education to diverse population, especially those over 65 years and with less access to healthcare.

A number of organizational issues were encountered during our pilot feasibility study. The main identified challenge for physical activity level screening was increased service time per participant, especially with the participants requiring interpreter services. Development and validation of questionnaires in other languages may be a practical solution for community-based health fairs, which have participants from different ethnic groups.

The other issue encountered was a comparatively small space provided for physical therapy screening station at the health fair venue. This led to long waiting lines and it is possible that we lost few participants who did not want to wait. Some participants had hearing issues, requiring the testers to speak loudly, which led to increased noise level at the screening station. We recommend

estimating possible number of participants, based on previous years and marketing outreach, then allocation of adequate space for screening stations at health fairs. This is particularly important as some elderly participants may be slow to move given mobility issues or the use of an adaptive device for standing and walking.

Despite the challenges that we have identified, our pilot study has shown that screening physical activity levels at community health fairs is worthy. Better planning and organization is recommended to overcome the barriers.

Fall risk factors, especially vision impairment, sleep disturbances, dizziness, numbness in feet and use of gait assistive device were significantly associated with decreased balance confidence, as is reported in literature. However, balance confidence was not significantly predictive of physical activity levels. We therefore believe that presence of other risk factors for falls may be more robustly predictive of self-reported compliance with physical activity recommendations for older adults.

A wide range of variations were found with physical activity levels across our sample population. 65% of participants were physically active for more than 2 days per week and less than 50% reported more than 2 hours of sedentary time each day. The small number of participants in this pilot study spread across different age groups may explain the variability of physical activity levels.. Future studies looking at the environmental influences particularly residence, may provide additional information about environmental support and barriers to increased physical activity levels.

Our NHANES PAL assessments showed that only about half of the sample met the recommended moderate-to-vigorous physical activity (MVPA) cumulative time consistently on a

weekly basis. Further analysis showed that neither balance confidence nor most of the fall risk factors measured in this project significantly predicted achievement of the weekly cumulative MVPA and VPA times. It is possible that many participants engaged mostly in activities of daily living, which are important for functional independence and contribute to physical activity time but may be insufficient to provide recommended levels of physical activity for health benefits. This is an important finding, which highlights the importance of educating older adults of not just increased physical activity but also the required level/intensity of physical activity for health benefits. Additionally, since activities of daily living alone may not provide the adequate level/intensity of physical activity there is a need to develop resources for the older adults to engage in increased levels of physical activities in safe environments. Some examples may include leisure/fun activities like sporting or supervised exercise programs. Similarly, the older adults will benefit with gymnasiums or outdoor fitness areas that are safe and promote increased levels of physical activity. These environments may have additional benefits of improved emotional and mental well-being from socialization and improved community participation. Paradoxically, use of a gait aid and use of anti-hypertensive medications were significantly predictive of meeting the cumulative weekly recommendation for MVPA. The observed trends may reflect adherence with advice from medical practitioners to increase activity levels, which is common given these health risk factors.[18, 19] Pain appeared to be an important limiter to achievement of weekly cumulative VPA recommendations, so pain management may be important to promote adequate physical activity to lower health risk factors.

This study had certain limitations. As a cross-sectional study, we can only infer associations and not definitively establish causation. Second, this study examines data from one specific free wellness fair in San Francisco, which limits sample representation, so the results of

this study must be verified in other locations. Third, physical activity levels, health related factors and balance impairments were self-reported, so may include a recall bias. The extent of potential distortion related to recall bias was not measured in this study. Fourth, because the health fair was in downtown area, the participants needed to be mobile enough and have access to transportation to be able to access the fair, introducing a potential selection bias. Fifth, we did not consider socioeconomic status (SES). A low SES has been associated with unmet healthcare needs [20] (Lindstrom et al - <https://www.ncbi.nlm.nih.gov/pubmed/28443488>); additionally, people who are physically active and have a low SES may have a better self-rated health than those with low activity levels and a higher SES (Johansson et al - <https://www.ncbi.nlm.nih.gov/pubmed/30736815>). [21].

#### CLINICAL RELEVANCE

Health care providers should enquire of an individual's physical activity level.[22] Similarly, the providers should consider educating the individuals about the recommended levels of physical activity for health providers and resources for improving physical activity levels.

Falls, risk factors for falls, and balance confidence do not predict a person's physical activity level. Lower physical activity levels are associated with multiple adverse conditions including increased body fat,[23] systemic inflammation,[24] and mortality.[25,26] As a part of the healthcare team, physical therapists are qualified and ideally positioned to screen for and educate regarding physical activity levels ([Bezner](#); [Healey](#); [Verhagen](#); [Shirley](#)). [27, 28, 29, 30] In addition to screening for falls during an evaluation,[31] physical therapists should inquire about a patient's physical activity level, and assist the patient to increase it closer to the recommended values.

Policy makers in disciplines of public health, behavioral health and environmental planning should continue to investigate improved resources for increased physical activity levels in community environments that promote wellness behaviors.

#### FUTURE RESEARCH

Our pilot study provides preliminary assessments of screening of physical activity levels in community-based health fairs. Further investigation of effectiveness of questionnaire-based screening of physical activity levels during health fairs is necessary to validate these conclusions. Additional studies to determine optimal screening methods, intervals between repeated testing for enhanced surveillance and interventions may help establish effective health fairs. We also recommend further research to investigate whether education regarding physical activity results in increased physical activity levels.

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