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Correlates of changes in walking during the retirement transition: The Multi-Ethnic Study of Atherosclerosis[☆]

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ABSTRACT

Retirement from employment involves disruption in daily routines and has been associated with positive and negative changes in physical activity. Walking is the most common physical activity among older Americans. The factors that influence changes in walking after retirement are unknown. The study objective was to identify correlates of within-person change in recreational walking (for leisure) and transport walking (to get places) during the retirement transition among a multi-ethnic cohort of adults (N = 928) from six US communities. Correlates were measured at the individual (e.g., gender), interpersonal (e.g., social support), and community (e.g., density of walking destinations) levels at study exams between 2000 and 2012. Comparing pre- and post-retirement measures (average 4.5 years apart), 50% of participants increased recreational walking by 60 min or more per week, 31% decreased by 60 min or more per week, and 19% maintained their recreational walking. Forty-one percent of participants increased transport walking by 60 min or more per week, 40% decreased by 60 min or more per week, and 19% maintained their transport walking after retirement. Correlates differed for recreational and transport walking and for increases compared to decreases in walking. Self-rated health, chronic conditions, and perceptions of the neighborhood walking environment were associated with changes in both types of walking after retirement. Further, some correlates differed by gender and retirement age. Findings can inform the targeting of interventions to promote walking during the retirement transition.

1. Introduction

Retirement from employment is associated with disruption in daily routines and social networks and increased focus on maintaining health (Felner et al., 1983; Beck et al., 2010; McDonald et al., 2015; Berg et al., 2014). These shifts in routine and focus may provoke positive or negative changes physical activity (Barnett et al., 2012a). Promoting positive changes in physical activity at retirement could help to reduce the burden of chronic disease in later life (Chodzko-Zajko and American College of Sports Medicine Position Stand, 2009; US Department of Health Human Services, 2008; Colditz, 1999).

Better understanding of the correlates of behavior change at retirement is needed to promote physical activity among retirees (Hirvensalo and Lintunen, 2011; Baxter et al., 2016). The most common physical activity among retirement-aged Americans is walking (Centers for Disease Control and Prevention (CDC), 2012). Walking also is among the most accessible physical activities: it requires no special equipment and is available to persons with a wide range of physical abilities (US Department of Health and Human Services, 2015). The correlates of walking may differ depending on its purpose: recreation (for leisure or exercise) or transport (to get places) (Van Holle et al., 2012).

Correlates of walking change at retirement have not been explored. However, the Social Ecological Model and prior research on older adults suggest that correlates exist at multiple levels, including the individual (e.g., gender), interpersonal (e.g., social support), and community levels (e.g., walking environment) (Sallis et al., 2008). Identifying correlates from multiple levels and distinguishing between recreational and transport walking is important because interventions are likely to be more effective when targeted to specific types of activity and addressing correlates at multiple levels (Van Holle et al., 2012; Sallis et al., 2008). We aimed to identify correlates of within-person

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changes in recreational and transport walking at retirement among participants in the Multi-Ethnic Study of Atherosclerosis (MESA), a diverse cohort of United States (US) adults. We describe individual-, interpersonal-, and community-level correlates to inform development of interventions to promote walking among retirees.

2. Methods

2.1. Study population

The MESA is a prospective study of subclinical cardiovascular disease (CVD) (Bild et al., 2002). Briefly, 6814 adults aged 45–84 years and free of clinical CVD were recruited at six sites: Forsyth County, NC; Northern Manhattan and the Bronx, NY; Baltimore City and County, MD; St. Paul, MN; Chicago, IL; and Los Angeles County, CA. This study included MESA participants who were not retired at baseline (2000 − 2002) and retired during follow-up (by 2010–2012, N = 1062). Participants who were missing data on walking (N = 54) or potential correlates (N = 80) were excluded for a final sample size of 928. Excluded participants were more likely non-Hispanic black, low socioeconomic position (SEP), and reported worse health compared to included participants.

2.2. Retirement classification

MESA participants self-reported employment status at five exams. Participants who reported being retired and not working, retired and working, or retired and volunteering were classified as retired.

2.3. Walking

Recreational and transport walking were self-reported by MESA participants at four exams (2000–2002, 2002–2004, 2004–2005, 2010–2012). Walking frequency (days/week) and duration (min/day) for a typical week in the past month were multiplied to estimate min/week of each type of walking. Within-person changes in walking at retirement were calculated as the difference in min/week of walking reported at the last exam prior to retirement and first exam after retirement. Walking measures showed evidence of participants rounding their reports of walking minutes to the nearest 15-minute increment; also, the test-retest reliability of self-reported physical activity is better for categorical compared to continuous measures (Patterson, 2000). Therefore, changes in walking were categorized as “maintaining” (less than 60 min/week difference from pre-retirement), “decreasing” (60 min or more per week less than pre-retirement), or “increasing” (60 min or more per week greater than pre-retirement) for analyses. We explored alternative categorization cut points of 45 min/week and 75 min/week, which yielded similar findings.

2.4. Correlates

Potential correlates were selected based on the Social Ecological Model (Sallis et al., 2008) and existing literature (Saelens and Handy, 2008; Bauman et al., 2012; Engberg et al., 2012; Smith et al., 2015). Correlates were grouped into three levels: individual-, interpersonal-, and community-level (Table 1).

Eleven potential individual-level correlates were identified, of which eight were time-fixed (retirement age, gender, race/ethnicity, SEP, MESA site, car ownership, job type, and occupational physical activity before retirement). Three time-varying individual-level correlates were calculated as the difference between pre- and post-retirement measures: change in self-rated health, number of chronic conditions, and body mass index (BMI, kg/m^2).

Potential interpersonal-level correlates were change in partnership and caregiving status, and social support. Change in partnership and caregiving status was defined by the participant's status at the pre- and post-retirement exams. Social support was measured using the ENRICHD Social Support Inventory, which has good reliability (Cronbach's alpha 0.86) (Mitchell et al., 2003). The closest pre-retirement measure was used because many participants did not have post-retirement social support scores.

Community-level correlates were 16 measures of the neighborhood environment from the MESA exam closest to each participant's estimated retirement date, which was before retirement for 446 participants and after for 482 participants. Correlates included observed and perceived neighborhood attributes (Diez Roux et al., 2016). Observed attributes were assessed using data from local and federal governments and two commercial sources (National Establishment Time Series and Esri) for ZIP codes where ≥5 MESA participants were living from 2000 to 2010, using participants' geocoded addresses (Hirsch et al., 2014; Evenson and Wen, 2013; Walls and Associates, 2013; Bureau of the Census, US Department of Commerce, 2007). Observed attributes were: density of parks, recreational facilities, walking and social engagement destinations, street connectivity, and population density. Densities were calculated in ArcGIS (Redlands, CA) using a 1-mile radius around participants' homes (Hirsch et al., 2014), and were mean centered and scaled so that a 1-unit increase was equivalent to one standard deviation (Hirsch et al., 2014).

Perceived neighborhood attributes included 13 items grouped into four domains: walking environment, aesthetic quality, safety, and social cohesion (Echeverria et al., 2004). Participants rated each item (strongly agree to strongly disagree) for the area within a 20-minute walk or 1-mile of home. Item responses were grouped as unfavorable/neutral (referent group) or favorable (agree/strongly agree; index group), because favorable perceptions of the neighborhood may facilitate physical activity (Echeverria et al., 2004). Social cohesion was the sum of four items scored so that a higher number corresponded to greater cohesion.

2.5. Analyses

First, we described the distribution of each potential correlate and within-person changes in walking. We compared characteristics of participants who reported some vs. no walking using Chi-square (categorical), ANOVA (mean), or Kruskal-Wallis (median) tests ($\alpha = 0.05$). Next, we assessed collinearity between correlates at each level (individual, interpersonal, community). Densities of recreational facilities, walking destinations, and social engagement destinations were highly correlated. Based on substantive knowledge (Hirsch et al., 2014; Nathan et al., 2012; Sugiyama et al., 2012), only the density of walking destinations was included in multivariable models. No other correlates were strongly correlated ($r > 0.65$).

Next, logistic regression models were constructed to identify correlates of changes in walking at retirement. Recreational and transport walking were modeled separately. Participants who reported zero walking before and after retirement were excluded from the models because maintaining zero walking is qualitatively different from maintaining some level of walking. Separate logistic regression models were used to compare participants who decreased or increased walking after retirement relative to those who maintained walking levels after retirement. Separate logistic regression models were used rather than multinomial models to improve the interpretability of coefficients and to reflect the meaningful ordering of the outcome categories (i.e., benefits of increased walking and risks of decreased walking). A backward selection strategy was applied wherein all potential correlates were included in an initial model then removed sequentially using likelihood ratio tests to compare nested models. A significance threshold of $\alpha = 0.2$ was used to determine which variables to retain in models. All models included nine core variables: gender, retirement age, race/ethnicity, SEP, MESA site, season of both pre- and post-retirement exams, time between pre- and post-retirement exams, and pre-retirement walking tertile. Clustering within US census tracts, as a