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Dog-walking and sense of community in neighborhoods: Implications for promoting regular physical activity in adults 50 years and older

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ABSTRACT

This study investigates whether dog-ownership and neighborhood characteristics are associated with sense of community (SC) and neighborhood-based recreational walking (NRW) for older adults. A random sample of adults ≥50 years of age ($n=884$) provided information on SC, dog-related factors, neighborhood walking, and socio-demographics in telephone and postal surveys. Associations between dog-ownership, neighborhood characteristics, and NRW were estimated using logistic regression (i.e., odds ratios (OR)). Frequent dog-walkers (≥4 times/wk) were more likely than those not owning a dog to report a heightened SC (OR=1.94, $p<.05$) and to achieve ≥150 min/wk of NRW (OR=10.68, $p<.05$). SC was also tested but not found to mediate associations between neighborhood characteristics, dog-ownership and NRW. Older adults who walk dogs often in their neighborhoods may benefit from both increased physical activity and heightened sense of community to an extent that supports healthy aging. Longitudinal studies are needed to explore directions of associations among these factors.

1. Introduction

This study explores an intersection of two salient public health areas: aging populations in neighborhood settings and high levels of dog-ownership. Owning a pet may help support the health of older adults (Dembicki and Anderson, 1996; Johnson and Meadows, 2002), and dog-ownership is of particular interest for promoting dog-walking. Both social engagement and physical activity have been linked with dog-walking (Cutt et al., 2007; Johnson and Meadows, 2010; McNicholas and Collis, 2000; Rogers et al., 1993; Thorpe et al., 2006), and there is mounting evidence that both are protective of health later in life (Stuck et al., 1999; Yaffe et al., 2009). While dog-ownership may decline somewhat with increasing age (Wood et al., 2005; Yabroff et al., 2008), older dog-walkers appear positioned to maintain high levels of physical activity and social engagement (Gretebeck et al., 2012; Johnson and Meadows, 2010; Knight and Edwards, 2008; Shibata et al., 2012; Thorpe et al., 2006). Little is known, however, about the contextual factors that might be important for encouraging physical activity and social engagement among older adult dog-owners and non-owners.

Neighborhoods play increasingly important roles in promoting healthy aging (Yen et al., 2009) and studies have begun to explore both physical and social neighborhood characteristics that support or discourage walking in older adults (Fisher et al., 2010; Michael et al., 2006; Strath et al., 2007). More affluent and walkable neighborhoods appear to be associated with higher levels of neighborhood cohesion and sense of community (Du Toit et al., 2007; Wood et al., 2010). These same types of neighborhood also support physical activity, in particular walking (Du Toit et al., 2007; Wood et al., 2010). Sense of community, linked to perceptions of one's neighborhood (McMillan and Chavis, 1986), has also been positively correlated with neighborhood-based walking (Du Toit et al., 2007; Wood et al., 2010), although this has not been studied for older adults. Neighborhood-level determinants of dog-walking, including access to dog-friendly places and amenities and perceptions of neighborhood cohesion also appear to influence dog-walking patterns (Christian nee Cutt et al., 2010; Cutt et al., 2008a, 2008c, 2008d; McCormack et al., 2011). It is possible that regular dog-walking in neighborhoods may bolster sense of community and vice-versa (Wood et al., 2007, 2005).

The relationships between the neighborhood context, dog-ownership, physical activity and sense of community are complex. Sense of community is a psychological construct (Nasar and Julian, 1995), and therefore may lie on the causal pathway between contextual factors and walking behavior, but this hypothesis has yet to be tested in older adults. Creating neighborhood

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environments that support sense of community (i.e., that facilitate positive social interactions) could also result in more walking among residents. Social factors such as dog-ownership might directly influence physical activity (Christian et al., 2012), as well as indirectly influence physical activity via sense of community. Thus the objectives of this exploratory study were to examine: (1) the associations between dog-ownership, neighborhood characteristics, neighborhood-based recreational walking (NRW), and sense of community, and; (2) whether or not sense of community mediates the associations between dog-ownership, neighborhood characteristics and NRW, among adults ≥50 years of age. We focused on adults ≥50 years in this study because mid-life physical activity is predictive of mobility and physical activity later in life (Tikkanen et al., 2012).

2. Method

2.1. Study design and sample recruitment

Two independent, random cross-sectional samples of adults ($n=4422$) from the Calgary metropolitan area were recruited by telephone. Publicly-listed household telephone numbers in Calgary were sampled and the final digit of each number replaced with a random digit to ensure coverage of unlisted numbers. Trained interviewers contacted households, described the project, and screened for eligible participants. Eligible participants were ≥18 years of age, proficient in English, and in the case of multiple members of one household being eligible, the individual with the most recent birthday was selected. Telephone-interviews captured information about physical activity behavior and socio-demographics. Telephone surveys were completed between August and October 2007 ($n=2199$; response rate=33.6%) or January and April 2008 ($n=2223$; response rate=36.7%). Survey respondents were invited to complete a follow-up postal survey with questions on dog-ownership, dog-walking, sense of community, and physical activity, sent within one week of the telephone survey. Of those completing the telephone survey, 2006 (45%) also completed the follow-up postal survey and of those, 1054 respondents reported being ≥50 years of age, the cut-off for being included in the current analysis. Our final sample included 844 adults (≥50 years of age, herein referred to as 'older adults') with complete data. The study was approved by the Conjoint Health Research Ethics Board at the University of Calgary in Alberta, Canada.

2.2. Dog-ownership and dog-walking

Respondents reported whether their household included one or more dogs, and dog-owners indicated how frequently they walked their dog(s) in a usual week (Cutt et al., 2008b). Three groups, reflecting the combination of dog-ownership and dog-walking frequency, were formed: (1) frequent dog-walkers (FDWs), who reported dog-walking at least four times per week (the mean value reported by Cutt et al. (2008a) for a sample of dog-owners, and also reflecting dog-walking on most days of the week); (2) infrequent dog-walkers (IDWs), who reported dog-walking three times per week or less, and; (3) non-owners (NOs).

2.3. Neighborhood characteristics

Built environment variables available at the municipal administrative boundary area-level included street pattern (curvilinear, warped-grid, and grid) (see Sandalack and Nicolai, 2006), proportion of green space (low, medium, and high tertiles) derived from the sum of land parcel areas allocated to green and open space divided by the total neighborhood area, and population density (low, medium, and high tertiles) derived from 2006 Canadian census. These built environment variables were linked to survey data via respondents' household 6-digit postal code (collected during telephone-interviews and then geocoded). Land use diversity and availability of destinations are indirectly captured in the street pattern and population density variables. For example, Calgary neighborhoods with curvilinear street patterns and low levels of pedestrian connectivity often include auto-oriented commercial stores and services, while neighborhoods with grid street patterns offer a higher density and mix of commercial stores and services that are integrated within a highly-connected pedestrian network (Sandalack and Nicolai, 2006).

Social environment measures of neighborhood education (% residents without a high school diploma) and income (median gross annual household income) from the 2006 Census (Statistics Canada) were obtained at the dissemination area level (the smallest standard geographical area for which Census data is available; n~400–700 people). Dog population density (number of licensed dogs/km^2) was estimated at the municipal administrative boundary level using 2008 Animal License data collected by the local government (which estimates 90% compliance with dog licensing) and was tertiled (low, medium, and high). Social environmental variables were also linked to survey data via the respondent's household postal code.

2.4. Neighborhood-based recreational walking (NRW)

Using items adapted from the International Physical Activity Questionnaire (IPAQ) (Craig et al., 2003), the postal survey captured the amount of time spent in the last seven days walking for recreation inside the neighborhood (i.e., defined as everywhere within a 15-min walk from home). NRW was dichotomized at 90 min/wk, a level that may help maintain cognitive function (Weuve et al., 2004), and 150 min/wk, the level recommended by the current Canadian physical activity guidelines (Canadian Society for Exercise Physiology, 2011). We specifically focus on recreational walking as this type of physical activity is the most common among middle-to-older aged adults (Bryan and Katzmarzyk, 2009; Yusuf et al., 1996).

2.5. Sense of community

Sense of community (SC) was assessed using 15 items adapted from Nasar and Julian's (1995) Psychological Sense of Community in the Neighborhood Scale. Individual items had moderate to high test–retest reliability (see Supplement). Items' scores were summed to derive a SC total score (Cronbach's alpha=0.86). SC scores were medianized (low SC≤45 vs. high SC > 45).

2.6. Socio-demographic characteristics

Respondents' self-reported health (poor to fair; good; or very good to excellent), dwelling type (detached vs. attached), neighborhood tenure (years), age (50–64 years vs. ≥65 years), gender, marital status (single/divorced/separated/widowed vs. married/common-law), annual gross household income (≤$60,000/year, $60,000–119,000/year, ≥$120,000/year, or unknown/refused), and highest level of education (≤high school, trade school/college, or university) were captured.

2.7. Statistical analysis

Respondent characteristics (i.e., NRW, SC, neighborhood tenure, dwelling type, age, gender, self-reported health, marital status, education, and annual household income) and neighborhood