Odds of Getting Adequate Physical Activity by Dog Walking


Background: We aimed to determine the likelihood that adult dog owners who walk their dogs will achieve a healthy level of moderate-intensity (MI) physical activity (PA), defined as at least 150 mins/wk. Methods: We conducted a systematic search of 6 databases with data from 1990–2012 on dog owners’ PA, to identify those who achieved MI PA. To compare dog-walkers’ performance with non–dog walkers, we used a random effects model to estimate the unadjusted odds ratio (OR) and corresponding 95% confidence interval (CI). Results: We retrieved 9 studies that met our inclusion criterion and allowed OR calculations. These yielded data on 6980 dog owners aged 18 to 81 years (41% men). Among them, 4463 (63.9%) walked their dogs. Based on total weekly PA, 2710 (60.7%) dog walkers, and 950 (37.7%) non–dog walkers achieved at least MI PA. The estimated OR was 2.84 (95% CI 2.09–3.60). Conclusion: Across 9 published studies, almost 2 in 3 dog owners reported walking their dogs, and the walkers are more than 2.5 times more likely to achieve at least MI PA. These findings suggest that dog walking may be a viable strategy for dog owners to help achieve levels of PA that may enhance their health.

Keywords: exercise, pet ownership, health promotion

Insufficient physical activity (PA) is a significant risk factor for a wide variety of chronic diseases and conditions and is associated with increased medical costs.1,2 According to the 2008 Physical Activity Guidelines for Americans, “for substantial health benefits, adults should do at least 150 minutes a week of moderate-intensity (equivalent to a brisk walk for many people), or 75 minutes a week of vigorous-intensity aerobic physical activity, or an equivalent combination of moderate- and vigorous-intensity aerobic activity (MVPA).”3

According to these PA Guidelines, aerobic activity should be performed in episodes of at least 10 minutes, and preferably, it should be spread throughout the week. Some PA is better than none, and any amount seems to confer some health benefits.3 Approximately half of the US adult population does not achieve recommended levels of PA.4,5 This high rate of inadequate PA underscores the need to identify strategies to promote physical activities that are practical, sustainable, and accessible to as many people as possible. Dog walking may be such a strategy. Walking is a popular, easy, and sustainable form of physical activity with proven health benefits and a low risk of injury.5

The US pet ownership statistics show that 36.5% of households in the United States have at least 1 dog.7 A number of health benefits are associated with owning dogs.8,9 In addition to the health benefits of dog ownership, per se, a growing body of literature demonstrates an association between dog ownership and PA.10–12 Several characteristics of dog walking suggest that encouraging people to engage in dog walking may be an effective means of increasing overall PA levels and improving the health of the US population.13 For example, dog walking is a purposeful activity, and dogs can provide social support, companionship, and an increased sense of safety for walking.14 The association of dog walking with PA guidelines adherence has been examined.15 However, most studies have not examined the likelihood of reaching PA levels deemed important to health among dog owners who walk their dogs as opposed to dog owners who do not walk their dogs. To our knowledge, there are no published compiled data showing this prevalence.

Objectives

The goal of this review and meta-analysis was to determine whether adults who own and walk a dog are more likely achieving 150 minutes of PA per week than adults who own a dog but do not walk it.

Methods

Search Strategy

To identify potentially relevant articles for this review, 6 electronic databases were searched for the period January 1990 to May 2012 (Table 1), with the assistance of the Centers for Disease Control and Prevention (CDC) Library and Information Center. Members of the International Dog Walking and Activity Group were consulted to check for missing or unpublished studies.

Screening and Abstraction Strategy

Our search produced a total of 199 abstracts. Later, we added an article that was not captured by the search. Two reviewers independently screened and examined each abstract and discarded those that did not provide data on dog owners’ physical activity.
behavior. Reviews, reports, case reports, and qualitative studies were excluded. Full-text articles in PDF format were collected for the abstracts that passed the screening process. These articles were then reviewed to determine if they provided physical activity data for dog owners who walk their dog (DW) and dog owners who do not walk their dog (NDW).

Seven studies identified DW by the answer to a dichotomous question regarding whether they walked their dog, one study by the response to a question as to whether they walked their dog for at least 10 minutes at a time over the preceding week, and another study by the response to a question as to whether they walked with the dog at least 3 times per week. For each of these studies, we examined outcome data (total weekly physical activity, time spent walking the dog, total weekly walking time, the number or percentage of individuals who achieved at least 150 minutes of PA per week). This amount of physical activity is common among the published PA recommendations over the time that the studies were conducted in 5 cities in the United States: Seattle, WA and Baltimore, MD; San Diego, CA; and Memphis, TN and Pittsburgh, PA; 1 was conducted at the state level in Michigan; and 1 study used a national sample. Three studies from Australia included those conducted in New South Wales, Perth, and Queensland. One study was from a national sample in Japan. Of the 9 studies, 8 used a cross-sectional design; 1 used a prospective cohort design and was analyzed both cross-sectionally and longitudinally. For the latter study, we used only the cross-sectional data from the second measurement cycle. Altogether these studies provided a total sample of 6980 dog owners (41% male, 59% female) ranging in age from 18 to 81 years. Among these, 4463 (63.9%) reported that they walked their dogs. Eight studies used self-reported questionnaires and 1 study used accelerometers to assess dog owners’ PA.

Key study features included author, year, study design, survey characteristics, sample characteristics, dog owner characteristics, and method of PA assessment (Table 2).

**Table 1 Search Strategy**

<table>
<thead>
<tr>
<th>Search syntax for electronic databases</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Key terms:</strong> (dog or dog walking or dog ownership or canine or pet or pet ownership or companion animal or human animal interaction) AND (walk* or physical activity or leisure-time physical activity or leisure-time exercise or physical fitness or health* or human health)</td>
</tr>
<tr>
<td><strong>Study designs:</strong> (intervention)* or controlled clinical trial or evaluation studies or process evaluation or evaluation* or randomized controlled trial or random allocation or non randomized or nonrandomized or nonrandomized or pseudo randomized or quasi experimental or pseudo experimental or experiment* or cross-sectional study or comparative studies or comparison* or controlled before and after study or uncontrolled before and after study or cohort study or cohort studies NOT (reviews or reports or case reports or qualitative studies)</td>
</tr>
<tr>
<td><strong>Search restrictions:</strong> Age: 18–100 years. Subjects: human subjects only. Language: English only. Publication dates: January 1990–May 2012.</td>
</tr>
</tbody>
</table>


**Analysis**

We pooled data from the abstracted studies using Comprehensive Meta-Analysis statistical software to estimate the prevalence odds ratios (OR) and corresponding confidence intervals (CI) of achieving 150 minutes per week of at least moderate-intensity, total PA participation by dog walking status among dog owners. We used the random effects model in estimation, which allows for heterogeneity between studies.

**Results**

Of the 200 records collected, we retrieved a total of 44 relevant articles on dog ownership and health outcomes. Of these, 9 studies met our inclusion criterion and allowed us to collect the data to calculate the prevalence OR of achieving a total of 150 minutes per week of at least moderate intensity PA. Three studies had been conducted in 5 cities in the United States: Seattle, WA and Baltimore, MD; San Diego, CA; and Memphis, TN and Pittsburgh, PA; 1 was conducted at the state level in Michigan; and 1 study used a national sample. Three studies from Australia included those conducted in New South Wales, Perth, and Queensland. One study was from a national sample in Japan. Of the 9 studies, 8 used a cross-sectional design; 1 used a prospective cohort design and was analyzed both cross-sectionally and longitudinally. For the latter study, we used only the cross-sectional data from the second measurement cycle. Altogether these studies provided a total sample of 6980 dog owners (41% male, 59% female) ranging in age from 18 to 81 years. Among these, 4463 (63.9%) reported that they walked their dogs. Eight studies used self-reported questionnaires and 1 study used accelerometers to assess dog owners’ PA.

The owners’ reported weekly time spent walking the dog varied from 46 minutes to 300 minutes (Table 3). The total weekly walking time of owners who walked their dogs, as reported in the studies, varied from 120 minutes to 252 minutes. The total weekly PA time varied from 210 to 410 minutes. Based on total weekly PA of 6980 dog owners, 2710 (40.7%) who walked their dogs and 950 (37.7%) who did not walk their dogs met levels of PA recommended in the aerobic component of the 2008 Physical Activity Guidelines for Americans (Table 4).
Table 2  Characteristics of the Included Studies of Physical Activity (n = 9)

<table>
<thead>
<tr>
<th>Author, year</th>
<th>Survey location</th>
<th>Sample characteristics</th>
<th>Study sample characteristics (N, age, male status, % dog owners)</th>
<th>Dog owner characteristics (N, age and male status)</th>
<th>PA measure and instrument</th>
</tr>
</thead>
</table>
| Bauman, 2001 | New South Wales, Australia          | Telephone survey respondents of a population-based random sample drawn from the Electronic White Pages (Response rate: 74%) | N = 894  
Age: Range of 25–64 yrs.  
Male: 45.6%  
Dog owners: 46% | N = 410  
Age: Not specified  
Male: Not specified | Self-reported PA questions from the Australian Bureau of Statistics of 1991 |
| Coleman, 2008 | Seattle, Washington, and Baltimore, Maryland, USA | Participants selected from the “Neighborhood Quality of Life Study” designed to compare multiple health outcomes among residents of neighborhoods stratified on characteristic of the ability to walk in the neighborhood (Response rate: NR) | N = 2199  
Age: Range of 20–65 yrs.  
Male: 52%  
Dog owners: 28% | N = 612  
Age: Range of 20–65 yrs.  
Male: 55% | PA assessed by accelerometer for 7 consecutive days for at least 10 h/day |
| Cutt, 2008   | Perth, Western, Australia           | Dog owners identified from individuals participating in the RESIDE Project during the first follow-up of a 5-yr longitudinal study (Response rate: 33.4%) | N = 1379  
Age: Not specified  
Dog owners: 45.6%  
(for additional description of the population from RESIDE, see Giles-Corti, 2008) | N = 629  
Age: Not specified  
Male: Not specified | Self-reported PA questions from RESIDE’s Neighborhood Physical Activity Questionnaire |
| Hoerster, 2011 | San Diego, California, USA         | Respondents to a mailed survey of dog-owing clients of 2 veterinary clinics in 2008 (Response rate: For Clinic 1 = 31.4%, retest = 74%; and, for Clinic 2 = 32.6%, retest = 82%) | N = 984  
Age: Mean of 52.3 (SD = 13.7) yrs.  
Dog owners: 100% | N = 984  
Age: Mean of 52.3 (SD = 13.7) yrs.  
Male: 22.2% | Self-reported questions specific for the study (paper and pencil) |
**Table 2 (continued)**

<table>
<thead>
<tr>
<th>Author, year</th>
<th>Survey location</th>
<th>Sample characteristics</th>
<th>Study sample characteristics (N, age, male status, % dog owners)</th>
<th>Dog owner characteristics (N, age and male status)</th>
<th>PA measure and instrument</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lentino, 2012</td>
<td>Sample from multiple sources, USA</td>
<td>Participants recruited via classifieds advertisements (Craigslist.org), social networking group forums (Dogster.com), and dog-related blogs (Response rate: 95%)</td>
<td>N = 916 Age: Mean of 40.0 (SD = 13) yrs. Male: 22% Dog owners: 58.5%</td>
<td>N = 536 Age: Range of 27–56 yrs. Male: 16%</td>
<td>Self-reported PA questions from International Physical Activity Questionnaire Short Form (IPAQ-SF)</td>
</tr>
<tr>
<td>Oka, 2012</td>
<td>Japanese national sample, Japan</td>
<td>Respondents of an Internet-based survey in Japan (Response rate: 31.3%)</td>
<td>N = 5253 Age: Range of 20–79 yrs. Male: Not specified Dog owners: 18%</td>
<td>N = 834 Age: Mean of 42.0 (SD = 12.4) yrs. Male: 43.4%</td>
<td>Self-reported PA questions from IPAQ-SF</td>
</tr>
<tr>
<td>Reeves, 2011</td>
<td>State of Michigan, USA</td>
<td>Participants of the 2005 Michigan Behavioral Risk Factor Survey (BRFS) (Response rate: 51.1%)</td>
<td>N = 5819 Age: Range of 18–65 yrs. Male: 38% Dog owners: 41%</td>
<td>N = 2170 Age: range = 18–65 yrs. Male: 38%</td>
<td>Self-reported BRFSS questions for dog ownership and walking</td>
</tr>
</tbody>
</table>

Abbreviations: PA, physical activity.
### Table 3 Description of Dog Walkers’ Physical Activity (PA) Reported in the Studies

<table>
<thead>
<tr>
<th>Author, year</th>
<th>Weekly time spent walking the dog</th>
<th>Total weekly walking time</th>
<th>Total weekly PA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bauman, 2001</td>
<td>M = 0.95 (95%CI, 0.77–1.13) hrs (57 min)/wk</td>
<td>2.0 (95%CI, 1.8–2.2) hrs (120 min)/wk</td>
<td>M = 3.5 (95%CI, 3.1–3.8) hrs/wk (210 min/wk)</td>
</tr>
<tr>
<td>Coleman, 2008</td>
<td>Not specified</td>
<td>Not specified</td>
<td>M = 35 (SE, 24) min/day (245 min/wk)</td>
</tr>
<tr>
<td>Cutt, 2008</td>
<td>M = 133.8 (SD, 112.8) min/wk</td>
<td>M = 180.1 (SD, 161.4) min/wk</td>
<td>M = 356.5 (SD, 326.5) min/wk</td>
</tr>
<tr>
<td>Hoerster, 2011</td>
<td>M = 186.3 (SD, 7.4) min/wk</td>
<td>Not specified</td>
<td>M = 355.4 (SD, 378.5) min/wk</td>
</tr>
<tr>
<td>Lentino, 2012</td>
<td>Volume of 300 min/wk</td>
<td>Not specified</td>
<td>M = 4805.49 (MET min/wk)</td>
</tr>
<tr>
<td>Oka, 2012</td>
<td>M = 214.1 (SD, 189.5) min/wk</td>
<td>M = 252.2 (SE, 11.4) min/wk</td>
<td>M = 409.8 (SE, 19.1) min/wk</td>
</tr>
<tr>
<td>Reeves, 2011</td>
<td>Median = 85 (IQR, 37 to 173) min/wk</td>
<td>Median = 132 (IQR, 57–240)</td>
<td>At least 150 min/wk</td>
</tr>
<tr>
<td>Schofield, 2005</td>
<td>Modal = 30 min/day for 7 days/wk</td>
<td>M = 114.9 (SD, 197.9) min/wk</td>
<td>M = 334.8 (SD, 408.6) min/wk</td>
</tr>
<tr>
<td>Thorpe, 2006</td>
<td>M = 7 times per week (min not specified)</td>
<td>Not specified</td>
<td>At least 150 min/wk</td>
</tr>
</tbody>
</table>

Abbreviations: M, mean; SD, standard deviation; SE, standard error; IQR, interquartile range; CI, confidence interval; MET, metabolic equivalent.
The point estimate for random effects of meta-analysis was an OR (95% CI) of 2.74 (2.09, 3.60). The diamond represents the pooled OR of achieving 150 minutes of PA for dog walkers versus non-dog walkers (Figure 1). Significant heterogeneity between studies was found ($Q$-value = 47.141, $df$ = 8, $P < 0.001$)

**Discussion**

The goal of this review was to determine the crude prevalence OR of achieving 150 minutes of PA per week when owners walked their dogs. We reported PA indicators, such as time spent walking the dog, total weekly walking time, and total weekly PA. Our data show that dog owners who walk dogs are more physically active than owners who do not walk dogs based on total weekly PA, and they are 2.74 times more likely to achieve 150 minutes of PA than owners who don’t walk their dog (Figure 1).

Our findings are generally consistent with those from studies that have examined and compared PA between people who have and people who do not have dogs, and findings indicate that an association between dog ownership and increased PA exists in various population subgroups. A 2009 Canadian study of 658 dog owners and non–dog owners found that those dog owners who walked their dogs spent more time walking for leisure than dog owners who walked their dog minimally or not at all, and also walked more than people who did not own a dog. Specifically, dog owners who walked their dogs walked for leisure 383 minutes more than dog owners who walked their dog minimally or not at all and 339 minutes more than people who did not own a dog. In an observational study in the United Kingdom, among 11 466 pregnant mothers, dog owners were 50% more likely to achieve 3 or more hours of PA per week and were also more likely to participate in brisk walking than those who did not have a dog. A UK study of 2065 children aged 9 to 10 years found that those living in a household with a dog spent more time in light, moderate to vigorous, and vigorous PA and also recorded more overall accelerometer-activity counts, counts per minute, and overall steps compared with people who were not dog owners.

Table 4

<table>
<thead>
<tr>
<th>Achieved 150 min of PA per wk</th>
<th>Yes</th>
<th>No</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dog walkers</td>
<td>2710</td>
<td>1753</td>
<td>4463</td>
</tr>
<tr>
<td>Non–dog walkers</td>
<td>950</td>
<td>1567</td>
<td>2517</td>
</tr>
<tr>
<td>Total</td>
<td>3660</td>
<td>3320</td>
<td>6980</td>
</tr>
</tbody>
</table>

Figure 1 — Odds of achieving 150 min/week of physical activity by total weekly physical activity among dog owners who walk a dog versus dog owners who don’t.
found that, in participants paired with dogs, approximately 66% of all PA performed was dog-related and that average total weekly PA time increased from 2.8 hours from baseline to 3.9 hours posttest.34 These findings support the notion that having a dog and walking a dog can both add time to total weekly PA. Although most studies to date that have examined the relationship between dog walking and PA have been cross-sectional, a small intervention study (n = 58) found that dog owners who were encouraged to walk dogs increased total weekly walking from 57 to 150 minutes from baseline to 12 weeks, compared with an increase of 83 to 133 minutes in the control group.35 The intervention group also had 1823 more total pedometer step-counts compared with the control group in addition to the significantly higher trajectories in self-reported PA from baseline to 12 weeks (η² = 0.11–0.27).35 The latter finding demonstrated that an increase in time spent walking the dog did not reduce time spent walking without the dog.

The size, age, health status, and breed of the dog may influence the amount of time spent dog walking. Schofield et al found that the households with medium or large dogs had significantly more minutes of recreational walking per week than those with small dogs or no dogs.21 Reeves et al found that there was no overall effect of dog size on the prevalence of dog walking among all dog owners or weekly frequency of dog walking; however, walks were longer with larger breeds than with smaller breeds. Dog age was significantly related to prevalence and duration of dog walks (ie, older dogs were walked less frequently and for shorter duration than younger dogs).25

Dog walking as a strategy to increase PA could reach a large proportion of the US population. According to the American Veterinary Medical Association—US Pet Ownership and Demographics Sourcebook 2012, there are approximately 70 million dogs in US households.7 Dogs and other pets are becoming increasingly valued members of households. As an example, pet expenditures in the United States grew from $17 billion in 1994 to approximately $47.7 billion in 2010.36 Despite pets becoming increasingly valued as household and family members, as many as 36% of dog owners don’t walk their dogs. Depending on breed, health status, and age, most healthy dogs are recommended to get 30–60 minutes of exercise daily to remain fit.37 Simply walking a dog at a moderate intensity for the frequency and duration recommended for dogs would result in the dog walkers exceeding current guidelines for adults for moderate intensity aerobic PA. Even if walking the dog is performed at light intensity (less than 3 METS), health benefits accrue.38

In a study of diabetes patients, Peek and colleagues noted that dogs helped to maintain a PA regimen,38 suggesting the value of dog walking to patient care, while providing benefit to the dog, as well.

**Limitations and Strengths**

This review has some limitations. It included primarily cross sectional studies and no randomized control trials. The majority of the studies used self-reported PA. The studies described the criteria to achieve recommended levels of PA per week, but how recommended levels were computed was mixed. Achieving recommended levels of PA was based on total weekly PA, which did not enable us to determine what quantity of dog walking contributed to success of meeting recommendations. Finally, our crude estimate did not control for confounders.

However, strengths of this review are that it included a variety of studies conducted at local, state, and national levels, in a variety of populations, and in 3 countries. It is also the first study to determine the pooled prevalence ORs of achieving recommended levels of PA between dog owners who walk their dogs and dog owners who do not walk their dogs. This is important because dog ownership has costs related to caring for the dogs (such as feeding, veterinarian care, grooming), and household income is a strong predictor of PA. By including only dog owners in our review, we felt that we controlled, at least to some extent, for the effect of variable household income on the association under investigation.

**Conclusion**

Our systematic review revealed that, across 9 published studies, almost 2 in 3 dog owners report walking their dogs, and these particular walkers are more than 2.5 times more likely to have achieved recommended levels of PA when considering total weekly PA. Future research should examine whether adjustment for covariates affects this association. However, we found sufficient evidence that dog walking may be a viable strategy for dog owners to help reach recommended levels of PA to enhance their health.

**References**

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