

REVIEW ARTICLE (META-ANALYSIS)

## Speed and Distance Requirements for Community Ambulation: A Systematic Review



Nancy M. Salbach, PhD,<sup>a,b</sup> Kelly O'Brien, PhD,<sup>a</sup> Dina Brooks, PhD,<sup>a,b</sup> Emma Irvin, BA,<sup>c</sup> Rosemary Martino, PhD,<sup>d</sup> Pam Takhar, MSc,<sup>a</sup> Sylvia Chan, BScPT,<sup>e</sup> Jo-Anne Howe, BScPT<sup>b</sup>

From the <sup>a</sup>Department of Physical Therapy, Faculty of Medicine, University of Toronto, Toronto, Ontario; <sup>b</sup>Toronto Rehabilitation Institute—University Health Network, Toronto, Ontario; <sup>c</sup>Institute for Work & Health, Toronto, Ontario; <sup>d</sup>Department of Speech-Language Pathology, University of Toronto, Toronto, Ontario; and <sup>e</sup>Toronto Western Hospital—University Health Network, Toronto, Ontario, Canada.

### Abstract

**Objective:** To provide an overview of the research literature on distance and speed requirements for adults to walk outside the home.

**Data Sources:** We conducted a systematic review and searched PubMed, MEDLINE (Ovid), EMBASE, CINAHL, Scopus, PEDro, and The Cochrane Library from 1948 to May 2012, and other sources. Search terms included communities, walk, ambulation, and neighborhood.

**Study Selection:** Full-text peer-reviewed articles written in English, French, or Spanish reporting distance and/or speed requirements for individuals walking outside the home were considered eligible. Two authors independently screened titles and abstracts. One author reviewed full-text articles to determine inclusion. Of the 3191 titles and abstracts screened, 15 studies (.47%) were selected for detailed review. One author appraised methodological quality. Inadequate description of the reliability of the measurement methods and the population of the town/city assessed was noted.

**Data Extraction:** One author extracted data from included studies. A second reviewer independently verified extracted data for accuracy.

**Data Synthesis:** Seven studies examining 24 community sites and crosswalks in the United States, Australia, and Singapore were included. Three sites with the largest mean distance requirements for adults to walk were club warehouses (677m), superstores (183–607m), and hardware stores (566m). Three sites with the lowest mean distance requirements were walking at the front (16m) and back (19m) of the house, and at cemeteries (18m). The average speed required to cross the street in the time of a walk signal varied from .44 to 1.32m/s.

**Conclusions:** Distance and speed requirements for adults to walk in the community environment vary widely. Findings are relevant to judging capacity for community ambulation to carry out essential activities of daily living, educating patients, and setting rehabilitation goals.

Archives of Physical Medicine and Rehabilitation 2014;95:117-28

© 2014 by the American Congress of Rehabilitation Medicine

Walking is the primary means by which people carry out instrumental activities of daily living and fulfill many employment, social, and recreational roles.<sup>1</sup> There is an increasing need to consider distance and speed requirements for the elderly and for those living with conditions affecting mobility<sup>2</sup> to ensure successful outdoor ambulation and its attendant social participation.<sup>3,4</sup>

Rehabilitation professionals play a central role in ensuring that people with chronic disease have sufficient capacity to safely function in the home. If people with physical limitations are to engage in meaningful activities and be physically active to reduce

the risk of cardiovascular disease, then rehabilitation has to prepare them to walk not only indoors but also in the community.<sup>5</sup>

Walking distance and speed are 2 gait parameters with direct relevance to walking in the community,<sup>6</sup> and they are considered as global health indicators in the field of gerontology because of their predictive association with mortality.<sup>7,8</sup> Standardized measures of walking distance and speed, such as the 6-minute walk test<sup>9</sup> and the 10-m walk test,<sup>10</sup> respectively, have proven to be sensitive indicators of the effectiveness of exercise interventions in people with chronic conditions,<sup>11,12</sup> supporting their potential responsiveness as measures of treatment effect in rehabilitation and outpatient settings. An understanding of the distance and speed requirements to walk in community sites (eg, supermarkets, drugstores) necessary to perform instrumental activities of daily living would assist patients and health care professionals in a number of ways. These requirements could be used to help interpret performance on measures of walking distance and speed,

Presented as an abstract to the American Heart Association, May 9–11, 2012, Atlanta, GA.

Supported by a Canadian Institutes of Health Research (CIHR) Knowledge Synthesis grant (grant no. KRS-108449), an Ontario Ministry of Economic Development and Innovation Early Researcher Award, a CIHR fellowship award, 2 CIHR New Investigator Awards, and a Canada Research Chair.

No commercial party having a direct financial interest in the results of the research supporting this article has conferred or will confer a benefit on the authors or on any organization with which the authors are associated.

gauge readiness for community ambulation, and set realistic goals relevant to activities patients wish to perform. A review of the literature would provide a valuable resource for health care professionals working with elderly patients or individuals with mobility limitations resulting from chronic disease. Given the current absence of such a resource, the objective of this study was to provide an overview of the research literature on distance and speed requirements for people walking outside the home.

## Methods

### Overview

A systematic review was undertaken according to a review protocol developed by the research team.

### Search strategy

We searched 7 electronic databases (MEDLINE [Ovid], EMBASE, PubMed, CINAHL, Scopus, PEDro, The Cochrane Library) for studies from 1948 to May 2012. Search strategies were developed for each database with input from the research team and an information specialist. Search terms included *community ambulation*, *community walk*, *neighborhood walk*, and *neighborhood ambulation* (see appendix 1 for PubMed search strategy). We also surveyed the principal investigator's library and reference lists of the studies included in the review. Citations were uploaded to DistillerSR (<http://systematic-review.net>), a centralized online application used to complete study selection, quality appraisal, and data extraction.

### Selection criteria

Studies were considered eligible if they reported distance and/or speed requirements for walking outside the home in the peer-reviewed literature and were written in English, French, or Spanish. A study was excluded if it was a conference proceeding or dissertation, or limited to abstract form.

### Study selection

Two reviewers (N.M.S., P.T.) independently read titles and abstracts, and they classified studies as potentially relevant or not. A third reviewer was consulted if consensus could not be reached. We retrieved and uploaded the full-text articles of relevant citations to DistillerSR. Two coauthors (N.M.S., P.T.) created and piloted the eligibility screening form. Subsequently, 1 author (P.T.) reviewed and applied the eligibility criteria to all potentially relevant articles to determine inclusion in the review. A second author (N.M.S.) was consulted to resolve ambiguity.

### Data extraction

Two authors (N.M.S., P.T.) piloted the data extraction form and guide developed by the research team. One reviewer (P.T.) used the guide to extract the following data from included studies: general study information (eg, authors, publication date), study characteristics (eg, study objectives, geographic location, rationale

and selection of sites), measurement protocol (eg, start/endpoints, route), community characteristics (eg, city, province/state, country, population size), and results (ie, distances and speeds measured at each site). A second reviewer independently verified the extracted data. Discrepancies were resolved by consensus.

### Methodological quality assessment

The research team developed a quality appraisal checklist based on the interpretability and generalizability checklists of the Consensus-based Standards for the selection of health Measurement Instruments quality assessment checklist.<sup>13</sup> Two external researchers with expertise in walking rehabilitation were asked to apply the quality appraisal checklist to an included article and provide feedback on the addition and removal of items and the wording of the checklist. Revisions resulted in a 14-item checklist (see supplemental figure S1, available online only at <http://www.archives-pmr.org/>). Response options include "yes" and "no." For 7 items, there is a third response category labeled "can't tell" or "not applicable." Checklist items rated as "yes," "no," and "can't tell" were assigned a score of 1, 0, and 0.5 points, respectively, with the exception of item 13, for which "yes" and "no" were assigned a score of 0 and 1, respectively. A total quality score was derived by summing the item-level scores and expressing the summed score as a percentage. In the case of "not applicable," the number of these items was subtracted from the total to compute the quality score. After reviewing and comparing checklist ratings for 1 included study with the lead author (N.M.S.), 1 author (P.T.) independently applied the checklist to evaluate the methodological quality of the remaining 6 included studies. Given that this type of review has not previously been conducted, we did not exclude studies based on a quality criterion score in order to show the range of published studies and the methodological weaknesses in this field of study that should be addressed in future investigations.

### Data synthesis and analysis

We did not undertake a meta-analysis given the heterogeneity across studies in population size (3000–7,478,000), a variable that appeared to influence walking distance and speed requirements, and the statistics (either means or medians) used to summarize results. We conducted a narrative systematic review according to the Economic and Social Research Council.<sup>14</sup> The 4 steps of the framework include the following: (1) develop a theory of how functional walk tests aid in the rehabilitation of people with walking limitation (biological plausibility); (2) develop a preliminary synthesis of findings from included studies; (3) explore relationships within and between studies; and (4) assess the robustness of the synthesis.<sup>14</sup> To compare walking distance requirements across studies, we presented mean or median distances by site and population size in tabular and graphical form. To facilitate application of the results to clinical practice, we presented sites in order of increasing distance requirement. Within studies, we presented walking distances by population size. In 1 study where the distance from apartment buildings to community sites was measured, we presented walking distances by the age of the apartment building. It appears that building age was examined in this study to investigate how urban planning may have influenced proximity to amenities over time. Within and across studies, we considered the influence of site type, population size, country, and year of publication on estimates of walking distances and speed requirements. Population sizes were rounded to the nearest thousand and walking

#### List of abbreviations:

CI confidence interval  
ICC intraclass correlation coefficient

Download English Version:

<https://daneshyari.com/en/article/3448534>

Download Persian Version:

<https://daneshyari.com/article/3448534>

[Daneshyari.com](https://daneshyari.com)