Challenges Related to Walking in Persons with Peripheral Artery Disease

Angela J. Caldieraro-Bentley

*Medical University of South Carolina*

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Challenges Related to Walking in Persons with Peripheral Artery Disease

Angela J. Caldieraro-Bentley

A dissertation submitted to the faculty of the Medical University of South Carolina as partial fulfillment of the requirements for the Doctor of Philosophy in the College of Nursing

November, 2016

Approved by:

________________________
Teresa J. Kelechi, Chair, Advisory Committee

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Diane Treat-Jacobson

________________________
Martina Mueller
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Dedication

This dissertation is dedicated to my sons, Steven and Robert, my study buddies, who encouraged me throughout this process. I love you both. And to my mother, Kathleen Ann (Hanneken) Caldieraro; my constant cheerleader. Mom, wish you could be sharing in this moment. Thanks for always believing in me.
Acknowledgements

I would like to thank my dissertation committee members for their patience, encouragement, expertise and contributions: Dr. Teresa Kelechi, Dr. Diane Treat-Jacobson, Dr. Mathew Gregoski, and Dr. Martina Mueller.

I would also like to thank The Society for Vascular Nursing for the financial support to enable the completion of this research.
# Table of Contents

Dedication........................................................................................................ iii

Acknowledgement........................................................................................ iv

Table of Contents......................................................................................... v

Abstract........................................................................................................ viii

Introduction.................................................................................................. 1

Manuscript 1.................................................................................................. 9

  Table 1: Inclusion and Exclusion Criteria.................................................. 13

  Table 2: Review of Literature.................................................................... 14

  Figure 1: Search Results............................................................................ 12

Manuscript 2.................................................................................................. 21

  Table 1: Data from Literature Search........................................................ 39

  Figure 1: Social Cognitive Theory.............................................................. 36

  Figure 2: Search Results............................................................................ 37

  Figure 3: Motivators and Barriers.............................................................. 38

Manuscript 3.................................................................................................. 52

  Table 1: Collaborating Sites/Recruitment Pool........................................ 88

  Table 2: Inclusion/Exclusion Criteria....................................................... 88

  Table 3: Recruitment Methods................................................................. 89

  Table 4: Recruitment Flyers/Reasons for Non-enrollment....................... 91

Appendix A: Recruitment Flyer.................................................................... 94

Appendix B: Recruitment Brochure............................................................. 95

Appendix C: Revised Recruitment Flyer...................................................... 97
<table>
<thead>
<tr>
<th>Appendix</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>D</td>
<td>Frequently Asked Questions</td>
<td>98</td>
</tr>
<tr>
<td>E</td>
<td>Recruitment Site Initial Visit</td>
<td>99</td>
</tr>
<tr>
<td></td>
<td>Summary</td>
<td>102</td>
</tr>
<tr>
<td>A</td>
<td>MUSC IRB Approval Letter</td>
<td>105</td>
</tr>
<tr>
<td>B</td>
<td>IRB Approved Consent</td>
<td>106</td>
</tr>
<tr>
<td>C</td>
<td>IAA Agreement</td>
<td>112</td>
</tr>
<tr>
<td>D</td>
<td>Letter of Support: St. John’s Hospital/Prairie Heart Institute</td>
<td>113</td>
</tr>
<tr>
<td>E</td>
<td>Letter of Support for Recruitment: Community Memorial Hospital</td>
<td>114</td>
</tr>
<tr>
<td>F</td>
<td>Letter of Support for Recruitment: Community Memorial Medical Clinic</td>
<td>115</td>
</tr>
<tr>
<td>G</td>
<td>Letter of Support for Recruitment: HSHS</td>
<td>116</td>
</tr>
<tr>
<td>H</td>
<td>Letter of Support for Recruitment: Memorial Medical Center</td>
<td>117</td>
</tr>
<tr>
<td>I</td>
<td>Letter of Support for Recruitment: Prairie Cardiovascular Consultants</td>
<td>118</td>
</tr>
<tr>
<td>J</td>
<td>Copyright Statement from Elsevier</td>
<td>119</td>
</tr>
<tr>
<td>K</td>
<td>Instruments: Demographic Data</td>
<td>120</td>
</tr>
<tr>
<td>L</td>
<td>Instruments: ABI Worksheet</td>
<td>121</td>
</tr>
<tr>
<td>M</td>
<td>Instruments: Walking Impairment Questionnaire</td>
<td>122</td>
</tr>
<tr>
<td>N</td>
<td>Permission for WIQ</td>
<td>124</td>
</tr>
<tr>
<td>O</td>
<td>Instruments: Patient Health Questionnaire</td>
<td>125</td>
</tr>
<tr>
<td>P</td>
<td>Instruments: Jenkin’s Self-Efficacy for Walking Questionnaire</td>
<td>126</td>
</tr>
<tr>
<td>Q</td>
<td>Instruments: Self-Efficacy for Management Chronic Disease</td>
<td>128</td>
</tr>
<tr>
<td>R</td>
<td>Instruments: Social Support for Exercise Habits-Expert Scale</td>
<td>129</td>
</tr>
</tbody>
</table>
Appendix S. Permission for Social Support for Exercise Habits-Expert Scale…… 130
Appendix T. Instruments: Technology Survey…………………………………… 131
Appendix U. Procedure: ABI…………………………………………………… 132
Appendix V. Protocol Procedure……………………………………………… 133
Appendix W. Checklist………………………………………………………… 139
Appendix X. Script for Recruitment……………………………………………… 140
Appendix Y. Standard HIPAA Authorization…………………………………… 141
Abstract

**Purpose:** The purpose of this dissertation is to explore self-efficacy and its relationship to walking in the older person with peripheral artery disease (PAD). Specifically, the aim of this compendium is to identify measurement instruments for self-efficacy that are appropriate for individuals with PAD, explore motivators and barriers to walking for this population, and to describe the challenges of recruiting the older person with PAD for exercise trials.

**Design:** This dissertation is comprised of three manuscripts. Within the context of Self-Efficacy Theory, this dissertation includes integrative reviews of instruments used to measure self-efficacy, and motivators and barriers to walking in the older person with PAD. It also includes a feasibility study using Young et al.’s (2015) conceptual framework to evaluate the feasibility of recruitment of older persons with PAD into exercise trials.

**Conclusion:** This dissertation provides a better understanding of self-efficacy for walking in the older person with PAD. The dissertation research led to several findings. First, no reliable and valid instrument to measure self-efficacy in this specific population is available. However, the Self-Efficacy Expectations Scale and the Self-Efficacy for Managing Chronic Disease Scale are currently available, and may be acceptable options. Secondly, motivators and barriers to walking influence self-efficacy and participation in exercise trials. Armed with knowledge of motivators and barriers to walking in this population, healthcare providers can use this knowledge to design an acceptable walking intervention for a feasible exercise trial for the older person with PAD. The third finding revealed challenges in recruitment of the older person with PAD into exercise research trials that can be used to enhance recruitment in future trials.
Introduction

Peripheral artery disease (PAD) affects almost one-fifth of American adults over age 60 (Roger et al., 2011), and the incidence increases with age for both men and women (Allison, et al., 2007; Alzamora et al., 2010). When PAD is combined with cardiovascular disease, the risk for mortality increases (Narins et al., 2004; Novo, 2002). As an initial non-invasive treatment, clinical guidelines recommend that patients with intermittent claudication (IC) participate in a supervised walking program that gradually increases speed and distance (Hirsch et al., 2006). Unfortunately because there is no reimbursement for supervised exercise therapy for patients with PAD, these types of programs are lacking (Olin et al., 2010). Additionally, because many patients are unable to afford to pay for supervised exercise programs, it is necessary to explore unsupervised home based options to fill the gap.

Research has focused on different approaches to walking programs and produced mixed outcomes. A systematic review of clinical trials that compared supervised to non-supervised exercise therapy for people with PAD demonstrated that supervised exercise therapy improved walking distance (Fokkenrood et al., 2012; Mays, Rogers, Hiatt, & Regensteiner, 2013). Additionally, Guidon and McGee (2013a) found that a supervised walking program resulted in improved functional capacity and improved quality of life scores. Likewise, Collins, et al. (2011) found that an unsupervised home-based walking intervention increased walking speed and improved quality of life. Additionally, Gardner, Parker, Montgomery, Scott, and Blevins (2011) found that an unsupervised home-based walking program using an activity monitor with feedback and weekly instructions was as beneficial as a supervised walking program. Similarly, McDermott et al., 2013 found that cognitive behavioral intervention with group support and weekly goal setting improved walking distance and speed in people with PAD. Alternatively,
Oka, Altman, Giacomini, Szuba, and Cooke (2004), found that those individuals with PAD who participated in an unsupervised community walking program were not gaining much more benefit than those who were not walking.

Despite these mixed outcomes, one consistent finding in several studies is that individuals with PAD must have self-confidence in their ability to manage the task of walking. In a qualitative study, Lee, Avis, and Arthur (2007) identified the important constructs of self-efficacy as those that motivate adults to begin and maintain a walking program. Rejeski, Tian, Liao and McDermott (2008) found that persons with PAD not only had little desire to walk, but also had low confidence in their ability to walk. Additionally, in this same population, those with pain and depression had lower performance efficacy. However, a positive association has been found between walking frequency and duration with belief in ability to walk longer distances (Mullen, McAuley, Satariano, Kealey, & Prohaska, 2012).

Because of the existing barriers to supervised exercise programs and the mixed results of home-based or community-based walking programs, complicated by low self-efficacy of the person with PAD, alternative physical activity and the experiences of these individuals need to be explored. Future planning approaches to improve positive outcomes of these programs need to take into account motivators and barriers to walking and the individual’s views about feasibility, practicality, and previous experiences.

Originally, the study described in this dissertation was going to be a feasibility study to assess recruitment, retention and adherence to a technology enhanced, home-based, nurse-monitored walking program for the older person with PAD. Additionally, preliminary evidence of efficacy was to be evaluated. In alignment with Social Cognitive Theory (Bandura, 1986),
support provided by the nurse was to be the independent variable, with evaluation of self-efficacy before and after the exercise intervention.

The first step in the process to determine the efficacy of a prescribed walking program is to conduct research, specifically a randomized controlled trial with an adequate sample size for accurate and reliable results of experimental effect. However, challenges recruiting individuals with PAD into walking studies have been noted (Guidon & McGee, 2013b; Brostow, Hirsch, & Kurzer, 2015). The older adult with PAD is complex with co-morbid illness and sociodemographic burdens such as lack of transportation. Furthermore, there is gap in understanding of best practices for recruiting older adults into research studies, and specifically, into physical activity trials such as walking programs. Exploring recruitment approaches, and barriers and motivators to participation in exercise studies will inform future studies of recruitment approaches specific to older persons with PAD for exercise clinical trials. The originally planned study was to be a randomized controlled two-group pre- and post-intervention trial designed to assess feasibility and acceptability of a wearable activity monitor to track walking duration and adherence as well as to determine evidence for preliminary signals of efficacy on walking improvement. However, due to lack of enrollment and recruitment challenges, the study could not be conducted.

Presented in this dissertation are three manuscripts related to self-efficacy for walking in the older person with PAD and to research recruitment challenges for physical activity studies that exist in this population. The first manuscript describes self-efficacy for walking measurement instruments commonly used for patients with PAD. The second manuscript explores the key motivators and barriers to walking in the person with PAD and IC. This manuscript also includes characterization of environmental and social relationships that
encourage long-term adherence in a walking program specifically designed for the person with PAD and IC. The third manuscript describes the challenges in recruitment for exercise studies for the older person with PAD and makes recommendations for overcoming these barriers/challenges in the future.
References


Narins, C., Zareba, W., Moss, A., Marder, V. J., Ridker, P. M., Krone, R. J., & Lichstein, E. (2004). Relationship between intermittent claudication, inflammation, thrombosis, and recurrent cardiac events among survivors of myocardial infarction. *Archives of Internal Medicine, 164*(4), 440-446. doi: 10.1001/archinte.164.4.440


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An integrative review: Application of self-efficacy instruments for walking in populations with peripheral arterial disease

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Objective: The study objective was to identify which self-efficacy measurement instruments are being used for walking in patients with peripheral arterial disease (PAD), the psychometrics of these instruments, and recommendations for use in research on patients with PAD.

Background: PAD is a common problem for individuals with similar risk factors as cardiovascular disease (CVD). Experts recommend a supervised walking program with incremental increases in speed and distance as an initial treatment for patients with intermittent claudication. Because patients may experience pain while walking, there is a tendency to be nonadherent with exercise therapy, and many limit or avoid walking all together, resulting in a sedentary lifestyle. Self-efficacy plays a role in determining a person’s confidence in his or her ability to participate in an exercise program.

Methods: The integrative review method described by Wittmore and Knoff was used for this review (Wittmore R, Knoff K. The integrative review: updated methodology. J Adv Nurs 2005;52:546-53.). Publications were retrieved electronically and reviewed for inclusion on the basis of studies that measured self-efficacy for walking in populations with PAD, peripheral vascular disease, and CVD. The analysis consisted of 9 publications.

Results: Only 2 studies were specific to the population with PAD. The remaining studies addressed self-efficacy issues in CVD or congestive heart failure. The analysis identified 4 instruments based on Bandura’s Social Cognitive Theory that were used to assess self-efficacy: (1) The Self-Efficacy Expectation Scale, (2) The Self-Efficacy for Managing Chronic Disease Scale, (3) The Performance-Based Efficacy Scale, and (4) The Barriers Self-Efficacy Scale. The Self-Efficacy Expectation Scale was most frequently used in these studies.

Conclusions: The use of the Self-Efficacy Expectation Scale instruments for walking in patients with PAD is limited because reliability and validity have been demonstrated in an older, mostly white population with CVD and congestive heart failure. Instruments that encompass the key constructs of self-efficacy, including physical, personal, and environmental aspects, would allow full evaluation with identification of potential explanations for success or failure for the chosen outcome. This should be taken into consideration in future studies when using instruments of self-efficacy. (J Vasc Nurs 2013;31:118-130)

Approximately 8 million Americans have peripheral arterial disease (PAD), including approximately one fifth of adults aged more than 60 years.¹ The incidence of PAD increases with age for both men and women.¹,² PAD is a common problem for individuals and has the same risk factors as cardiovascular disease (CVD).³ An estimated one third of patients aged more than 50 years with atherosclerotic risk factors of cigarette smoking or diabetes have PAD,⁴ and when combined with CVD, the risk for recurrent cardiac events and mortality increases.⁵,⁶

The most recent guidelines recommend that patients aged more than 50 years with concomitant atherosclerotic risk factors be queried for claudication, walking impairment, ischemic rest pain, and nonhealing wounds.⁷ Although it is recognized that patients with PAD may have atypical symptoms or be asymptomatic,⁸ intermittent claudication, described as a cramping pain in the calf while walking, is indicative of lower-extremity ischemia. Because of this, any symptom of insufficient blood supply to the lower extremity is an indication for an ankle-brachial index (ABI). An index score of ≤0.90 is considered a positive ABI score for the diagnosis of PAD. A patient with a low ABI will benefit the most from recommended treatments for claudication, including an exercise-walking program.⁹

It is recommended that patients with intermittent claudication participate in a supervised walking program that gradually increases speed and distance as an initial treatment.¹⁰ Pain is a barrier to walking that may limit adherence to walking regimens, resulting in a sedentary lifestyle. Other barriers include limited access to...
supervised walking programs because of the lack of Medicare reimbursement for structured walking programs for patients with PAD. Additional barriers to walking may include comorbid diseases such as diabetes, neuropathy, and depression.

Prior research has demonstrated that self-efficacy can predict certain behavior, including exercise. Cardiovascular research has demonstrated that self-efficacy is positively associated with walking in the cardiac rehabilitation setting in those who have undergone cardiopulmonary bypass grafting and who have had myocardial infarction. However, few studies have examined self-efficacy for walking in the symptomatic patient with PAD. A comprehensive review to explore measures for self-efficacy for walking in individuals with PAD is necessary to guide descriptive and interventional research in this population.

The purpose of this integrative review is to provide the most comprehensive portrayal of the current use of self-efficacy measurement instruments for walking in symptomatic persons with PAD. The aims of this integrative review are to (1) identify which measurement instruments are used to measure self-efficacy for walking in the patient with PAD; (2) describe the reliability and validity of the existing self-efficacy for walking measurement instruments; and (3) determine which of the existing self-efficacy for walking measurement instruments are appropriate for the individuals with PAD.

THEORETIC FRAMEWORK

Albert Bandura introduced the concept of self-efficacy, which is used in multiple theories other than Social Cognitive Theory. The basic concept of self-efficacy is the belief that you can perform a specific task. For walking specifically, a positive association has been found between walking frequency and duration with belief in the ability to walk longer distances. Self-efficacy for walking has been positively associated with lower-extremity functioning, which would be important for persons with PAD. A qualitative study identified the important constructs of self-efficacy as those that motivate adults to begin and maintain a walking program. Individuals with PAD and intermittent claudication must have confidence in their ability to manage the specific task of walking.

Bandura and Walters’ Social Cognitive Theory (1963), an interpersonal health behavior theory, was used to guide this review. The key concepts of this theory are personal factors: biologic, knowledge achievement, and emotional factors; behavioral factors: modeling behavior; environmental factors: the complementary action among personal factors, behavior, and environment; and self-efficacy. Bandura proposed that self-efficacy can be improved by mastery experiences, social modeling, verbal persuasion, and control of negative thinking. People can remove barriers in their environment to regulate their behavior. By learning and practicing a specific behavior, individuals can become skilled in the behavior that positively affects the confidence of the person to perform the task. Feedback can be positive or negative, depending on the person’s psychologic state and interpretation. Physical and emotional states, such as pain, can affect self-efficacy. For example, low self-efficacy resulting in poor environmental control negatively affects behavior and results in poor outcomes, alternatively, high self-efficacy or high self-confidence can result in positive outcomes.

MATERIALS AND METHODS

An integrative review was conducted using the following databases: PubMed, PsyCINFO, Cumulative Index of Nursing and Allied Health Literature, and Cochrane. The following search terms were used, with date ranges from 2000 to 2012: “self-efficacy” AND “walking” or “mobility limitation” or “exercise” or “claudication” or “intermittent claudication” AND “peripheral arterial disease.” Because of the limited findings, the search was expanded to include “peripheral vascular disease” or “cardiovascular disease.” Search terms were determined after reviewing the existing literature and compiling associated key words and subject headings. Reference lists of included studies also were searched for articles published that were not revealed in the initial search. Inclusion and exclusion criteria that guided the search are included in Figure 1.

Data collection and analysis

Abstracts were reviewed and selected for inclusion for the integrative review on the basis of inclusion and exclusion criteria. Data extraction was conducted by using a standardized template. Articles were reviewed independently by each author, extracted data were peer reviewed, and consensus was reached by discussion of the 2 authors.

Quality scoring

The quality of the research methodology was evaluated and scored using the information provided in the published articles. Each article was scored by the first author and reviewed by the second author, and agreement for scoring each article was reached between the two authors. The Oxford Centre for Evidence-Based Medicine (OCEBM) Levels of Evidence were used to rate the level of evidence. The OCEBM system consists of 1 to 5 numeric scores to represent the type and quality of study. The numeric score can be graded down if the sample size is small or the effect size is small. Alternatively, the numeric score also can be graded up if the sample size is large with a large effect size. A description of the OCEBM system for level of evidence is shown in Table 1.

Search results

A total of 40 abstracts were identified from the initial review. Of these, 10 were duplicates and 22 did not meet the inclusion criteria, resulting in 8 articles for review. An additional hand search was performed, which yielded 1 article for a total of 9 articles, which described 4 self-efficacy instruments (Figure 1).

Findings

All of the studies assessed the end product of Bandura’s Social Cognitive Theory, that is, the achievement of self-efficacy. Each self-efficacy scale addressed the perceived confidence of the subjects’ ability to begin, maintain, perform, or exercise despite barriers to those behaviors, or to otherwise manage their chronic disease.
Figure 1. Search results.

RESULTS

Sample and subjects

Because of the lack of studies specific to the individual with PAD, the search criteria for this review was expanded to include CVD. This resulted in a diversity of populations included in this review. The results are shown in Table 2. Of the 9 studies included for review, only 2 were specific to the population with PAD. The remaining studies evaluated participants with CVD or congestive heart failure (CHF). The age of study participants ranged from 30 to 91 years. Participants with CVD had the widest age range of 30 to 84 years, which closely matched the CHF population age range of 30 to 85 years. Alternately, the mean ages of the participants in the PAD studies were 66.5 years and 75.6 years. Seven studies reported that the majority of participants were white, whereas only 2 studies reported the percentage of African American participants: 25.37% and 38%. Two studies did not report the race of the participants.

Although most studies included both men and women, most participants were men (68.7%; 79%), One PAD study enrolled more men (69%) than women (31%), and one study enrolled slightly more men (52.8%) than women. One CHF study was designed specifically for women.

Four studies were intervention trials in which the participants were randomized to a walking intervention or social cognitive intervention to improve self-efficacy. The remaining 5 studies were descriptive or descriptive correlational studies examining relationships between depression and walking self-
### TABLE 1

<table>
<thead>
<tr>
<th>Level of Study</th>
<th>Commonality of Issues</th>
<th>Accuracy</th>
<th>Prediction</th>
<th>Positive outcomes</th>
<th>Potential negative outcomes</th>
<th>Worthwhile Screening</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Local; random sample; survey</td>
<td>Consistent systematic review</td>
<td>Systematic review of beginning cohort studies</td>
<td>Systematic review of RCT</td>
<td>Systematic review of RCT</td>
<td>Systematic review of RCT</td>
</tr>
<tr>
<td>2</td>
<td>Systematic reviews that match to local issues</td>
<td>Single cross-sectional study consistent review</td>
<td>Beginning cohort studies</td>
<td>RCT or observation trial with huge effect</td>
<td>RCT or observation trial with huge effect</td>
<td>RCT</td>
</tr>
<tr>
<td>3</td>
<td>Local, nonrandomized sample</td>
<td>Inconsistent studies</td>
<td>Cohort study or control arm of RCT</td>
<td>Cohort/longitudinal study</td>
<td>Cohort/longitudinal study as long as sample size large enough to rule out harm</td>
<td>Cohort/longitudinal study</td>
</tr>
<tr>
<td>4</td>
<td>Case-series</td>
<td>Case-control studies</td>
<td>Poor-quality case or cohort study</td>
<td>Historical studies</td>
<td>Historical studies</td>
<td>Historical studies</td>
</tr>
<tr>
<td>5</td>
<td>NA</td>
<td>Instinctive reasoning</td>
<td>NA</td>
<td>Instinctive reasoning</td>
<td>Instinctive reasoning</td>
<td>Instinctive reasoning</td>
</tr>
</tbody>
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efficacy (e.g., in patients with PAD), post-cardiac procedure/surgery recovery and walking self-efficacy, or management of chronic disease (e.g., PAD and diabetes) and walking self-efficacy.

**Overview of instruments**

In the 9 articles for this review, 4 instruments were used to assess self-efficacy: (1) Self-Efficacy Expectation Scale, (2) Self-Efficacy for Managing Chronic Disease Scale, (3) Performance-Based Efficacy Scale, and (4) Barriers Self-Efficacy Scale. The most frequently used instrument was the Self-Efficacy Expectation Scale. These instruments were used to measure self-efficacy in conjunction with other instruments to measure physical activity in the studies. Only one scale was modified for a specific population, and the Performance-Based Efficacy Scale was developed for the purposes of the study (Table 2).

**SELF-EFFICACY EXPECTATION SCALE**

The Self-Efficacy Expectation Scale is a 62-item scale that measures self-efficacy behaviors related to recovery from cardiac events, including confidence in walking, lifting, performing general activities, climbing stairs, and working, which are physical attributes only. One study used the scale in its entirety, whereas the remainder of the studies used select subscales of the Self-Efficacy Expectation Scale. For example, the Self-Efficacy Expectation Scale includes 14 items on the scale specific for walking.

**Instrument administration and scoring**

The Self-Efficacy Expectation Scale is a paper scale, with data collected by interview format or self-administration. In one study, data were collected by phone interview after discharge from the hospital to maintain consistency with instrument administration. The instruments used numeric or percentage Likert-type scales to assess confidence. Numeric scales ranged from 0 to 10 points. Scoring was calculated for the scale as a whole for each subscale. The score was calculated by summing the numeric value of the confidence ratings in the percentage scale and dividing by the total number of items in the scale, resulting in a mean score. All scales ranked the lower numeric value with the lower confidence to perform exercise and the higher numeric value with the higher confidence. A higher mean score indicated a higher self-efficacy.

**Validity**

In 2 studies, content validity for the Self-Efficacy Expectation Scale was assessed by 4 expert raters in a previous report
<table>
<thead>
<tr>
<th>Authors</th>
<th>Purpose of Study</th>
<th>Design/Method</th>
<th>Sample/Setting</th>
<th>Intervention/Description</th>
<th>Scoring of Instruments</th>
<th>Validity</th>
<th>Reliability</th>
<th>Methodological Feasibility</th>
<th>Level of Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allen and Keller (2004)</td>
<td>Test effects of self-efficacy coaching intervention on physical activity self-efficacy on recovery of older adults after cardiac event</td>
<td>3-group time series design, randomized to 1 of 3 groups: (1) self-efficacy enhancement intervention protocol; (2) telephone protocol, which included exercise remains from nurse every 2 weeks; and (3) usual care and no additional support</td>
<td>N = 185, community sample, age 65-80 y (mean = 71.4, SD = 4.0); 63.7% men; 36.3% women; 31% with cardiac event, 10.7% with cardiac event-related to recovery from cardiac event; 79.5% married; Texas</td>
<td>Performance-related confidence in ability to perform physical activity</td>
<td>Likert scale measuring self-efficacy behaviors related to confidence in walking</td>
<td>Content validity estimated by expert review, tested as 0.92 as compared in previous study by Jenkins (1990)</td>
<td>Internal consistency: coefficient alpha for each data point ranging from 0.67 to 0.79 (reported by Jenkins 1990)</td>
<td>Paper and pencil</td>
<td>2</td>
</tr>
<tr>
<td>Collins et al. (2010)</td>
<td>Establish the relationship of self-efficacy with walking ability in persons with diabetes type 1 and 2 and PAD</td>
<td>Population-based study reporting baseline data from participants in RCT</td>
<td>N = 315, community sample, mean age 65.9 ± 4.2; 21% women; mean 11.1%</td>
<td>Self-efficacy for Managing Chronic Disease Scale: 6 items Likert scale measuring</td>
<td>1. symptom control</td>
<td>None reported for current study, note: alpha = 0.89 as reported in previous study</td>
<td>None reported for current study, note: alpha = 0.89 as reported in previous study</td>
<td>None reported for current study</td>
<td>3</td>
</tr>
<tr>
<td>Goff (2006)</td>
<td>Evaluate exercise self-efficacy in older women with heart failure (NYHA class II and III) enrolled in an exercise walking program</td>
<td>RCT, 2-group design; intervention, exercise walking program; control group, usual care</td>
<td>N = 32; 16 in each group; all women, age 59-85 y, 30% African American, 28% Hispanic</td>
<td>Modified exercise self-efficacy scale for women with heart failure (McAuley and Jacobson, 1992) 10-item Likert scale measuring confidence in overcoming barriers and meeting goals of exercise and adherence</td>
<td>10-point percentage scale 60-point incremental (100% = totally confident, 50% = half confident, 0% = not confident)</td>
<td>None reported</td>
<td>In intervention group, distance walked correlated with self-efficacy scale; 0.45, p = 0.003; self-efficacy scale (r = 0.5), p = 0.03; and self-efficacy scale (r = 0.32), p = 0.02, but not self-efficacy scale (r = 0.5), p &gt; 0.05</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>House et al. (2010)</td>
<td>Evaluate the effect of home-based cardiac rehabilitation program on physical activity levels, medication adherence, and self-efficacy expectations</td>
<td>RCT, intervention group: Social Cognitive Theory, home-based cardiac rehabilitation; control group, usual care</td>
<td>N = 56; age range 55-81 y, more than twostudy, Canada</td>
<td>French version of Canadian Self-Efficacy Scale: 36 items Likert scale measuring confidence in overcoming barriers and meeting goals of exercise and adherence</td>
<td>Responses 0-10</td>
<td>Not reported</td>
<td>Coach's alpha 0.70 (4/9)</td>
<td>Self-administered</td>
<td>2</td>
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<tr>
<td>Jenkins and Ganzana (1990)</td>
<td>Examine self-efficacy expectations and protection of walking ability during first year post-CABG</td>
<td>Descriptive, with pre- and postoperative groups and repeated measures</td>
<td>N = 199; 76% female, 10% white, 70% Hispanic, mean age 73 ± 9.7; underwent primary CABG; San Francisco</td>
<td>Self-Efficacy for Walking: Likert scale measuring confidence in ability to perform physical activity and walking activities ranging from test to bathroom in 6 weeks</td>
<td>10-point scale (10 = totally confident; 0 = not confident)</td>
<td>Not reported</td>
<td>Coach's alpha 0.60 (4/9)</td>
<td>In person (face-to-face) interview</td>
<td>4</td>
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<th>Table 2 (continued)</th>
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<td><strong>Authors</strong></td>
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<td>Ohira et al. (2005)⁶⁰</td>
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<td>Perkins and Jenkins (1998)⁶⁸</td>
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<td>Rajkovic et al. (2007)⁶⁷</td>
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<td>Simulation and Safety (1992)⁵⁹</td>
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CABG = coronary artery bypass grafting; NYHA = New York Heart Association; PAD = peripheral arterial disease; PTCA = percutaneous transluminal coronary angioplasty; RCT = randomized controlled trial; SD = standard deviation; SEM = standard errors; SIC = study improves log correlation; SIBS = walking and leg correlation study.
and was reported as 0.92.16,25 For that scale, predictive validity for self-efficacy and walking was demonstrated in two different study populations who received a walking intervention, including the first year postoperatively for primarily older white men who underwent coronary artery bypass grafting (N = 199)16 and for older women (38% African American) with CHF (N = 32).25 However, predictive validity was not supported in a randomized controlled trial (N = 83) testing two brief self-efficacy interventions in a primarily older white male population recovering from a cardiac event.25

Convergent validity was demonstrated in one descriptive correlational study (N = 90) in primarily older men in early recovery (ie, 1-2 weeks) from percutaneous transluminal coronary angioplasty with self-efficacy expectations and walking behavior performance.28 However, convergent validity was not demonstrated in a smaller (n = 51) correlational study with a nonsignificant negative correlation between barriers for exercise and self-efficacy expectations for walking in patients 4 to 8 months after discharge for percutaneous transluminal coronary angioplasty.17

Reliability

Three studies reported acceptable reliability (Cronbach’s alpha = 0.70-0.96) of the Self-Efficacy Expectation Scale in samples of 199, 51, and 65 participants. The study by Robertson and Keller demonstrated reliability for each subscale of the instrument (Cronbach’s alpha = 0.94, 0.87, 0.91). The Exercise Self-Efficacy Scale that was modified for the population with CHF reported a Cronbach’s alpha of 0.70.29

Feasibility

Although all of the scales are pencil and paper, some studies administered the instrument by interview method. None of the studies mentioned the time it took for the subjects to complete the self-administered scales, although the number of items on the instruments was reported to be between 6 and 62 items. The Self-Efficacy Expectation Scale can be divided by its subscales, so that only the applicable topics are used, thus decreasing the time spent completing an instrument. The 16-item Self-Efficacy Expectation Scale was administered in person and via telephone; however, the length of time for administration was not reported for this portion of instrument. None of the studies reported reading level or cultural sensitivity of the instruments or provided instructions for the completion of the instruments.

BARRIERS SELF-EFFICACY SCALE

The 14-item Barriers Self-Efficacy Scale measures the individual’s ability to overcome emotional, diversional, physical, and environmental barriers to exercise.

Instrument administration and scoring

The Barriers Self-Efficacy Scale is a paper scale, with data collected by interview format or self-administration. The instrument uses numeric Likert-type scales to assess challenges to being physically active. Numeric scales ranged from 0 to 10 points. Scoring was calculated for the scale as a whole and ranged from 0 to 140. The score was calculated by summing the numeric value and dividing by the total number of items in the scale, resulting in a mean score.19

Validity

Construct validity was demonstrated with an exploratory factor analysis with the Barriers Self-Efficacy Scale (r = −0.28 and −0.57, P < .0001) in patients with PAD with depressive symptomatology. In this study, convergent validity was moderately supported in performance-based self-efficacy for walking and desire for physical competence (r = 0.33, P < .01), barriers efficacy (r = 0.44, P < .01), total pain acceptance (r = 0.42, P < .01), activity pain acceptance (r = 0.29, P < .01), willingness to walk (r = 0.33, P < .01), satisfaction with function (r = 0.40, P < .01), and perceived control for walking (r = 0.40, P < .01).19

Reliability

Test-retest (1-3 weeks) reliability was demonstrated at r = 0.77 for the Barriers Self-Efficacy Scale in a separate sample of 62 participants, as well as an alpha internal reliability of 0.97.19

PERFORMANCE-BASED EFFICACY SCALE

The 10-item Performance-Based Efficacy Scale assessed the confidence of the individual to continuously walk prescribed distances at a brisk pace. This scale was created for the purpose of this study and has not been used in any other study.

Instrument administration and scoring

The Performance-Based Efficacy Scale is a paper scale, with data collected by interview format or self-administration. The instruments used numeric hierarchy arranged items with Likert-type scales to assess ability to perform an activity. Numeric scores ranged from 0% to 100% in 10-point increments. The lower numeric value was ranked with the lower confidence to perform the activity, and the higher numeric value was ranked with the higher confidence to perform the activity. The score was calculated by summing the numeric value or the confidence ratings in the percentage scale and dividing by the total number of items in the scale, resulting in a mean score. A higher mean score indicated a higher self-efficacy.

Validity

Construct validity was demonstrated with an exploratory factor analysis with the Performance-Based Efficacy Scale and the Barriers Self-Efficacy Scale (r = −0.28 and −0.57, P < .0001) in patients with PAD with depressive symptomatology.19

Reliability

Test-retest (1-3 weeks) reliability also was demonstrated by r = 0.77 for the Performance-Based Efficacy in a separate sample of 62 participants, as well as alpha internal reliabilities of 0.95.19 Reliability and validity testing for the Performance-Based Efficacy Scale and the Barriers Self-Efficacy Scale were performed on the same study participants.
Feasibility

The Performance-Based Efficacy Scale and the Barriers Self-Efficacy Scale were used in the study. Both scales are pencil and paper and were self-administered. The time required for the participants to complete the scales was not mentioned. These were only two short scales used in a battery of assessment scales for the study. The study did not report reading level or cultural sensitivity of the instruments or provide instructions for the completion of the instruments.

SELF-EFFICACY FOR MANAGING CHRONIC DISEASE SCALE

The Self-Efficacy for Managing Chronic Disease Scale is the one scale that did not measure walking or exercise. It is a six-item scale that measures the confidence of the individual to manage symptoms, fatigue, and pain of the condition, emotional and health management, as well as communication with healthcare providers regarding the chronic condition.

Instrument administration and scoring

The Self-Efficacy for Managing Chronic Disease Scale is a paper scale, with data collected by interview format or self-administration. The instruments used numeric Likert-type scales to assess confidence. Numeric scales ranged from 1 to 10 points. All scales ranked the lower numeric value with the lower confidence and the higher numeric value with the higher confidence. Scoring was calculated for the scale as a whole. The score was calculated by summing the numeric value and dividing by the total number of items in the scale, resulting in a mean score. A higher mean score indicated a higher self-efficacy.

Validity

Predictive validity was demonstrated for the Self-Efficacy for Managing Chronic Disease Scale and walking in a convenience sample (N = 145) of patients with PAD. A high self-efficacy score predicted greater walking distance (coefficient, 34.5; standard error, 11.3; P = .0027).

Reliability

The study that used the Self-Efficacy for Managing Chronic Disease Scale reported a coefficient of 0.91 from a previous report, but did not report reliability for their specific study of patients with PAD.

Feasibility

The Self-Efficacy for Managing Chronic Disease Scale is a pencil and paper scale and was self-administered. The time required for the participants to complete the scales was not mentioned. The study did not report reading level or cultural sensitivity of the instruments or provide instructions for the completion of the instruments.

DISCUSSION

The discussion will address the theoretic framework and evaluate the appropriateness of use of instruments in the population with PAD by analyzing the conceptual, methodological issues, demographics, psychometrics, and feasibility of the instruments.

Conceptual issues

Bandura’s Social Cognitive Theory posits that an individual’s behavior change is influenced by the environment, the person, and the behavior. Conceptually, the concept of self-efficacy itself had varied measurement dimensions in these four instruments, as illustrated in the number of items included in each instrument. For example, the Self-Efficacy Expectation Scale and the Performance-Based Efficacy Scale measure only physical attributes of ability to walk (distance), which refers to the self-efficacy of the behavior. Environmental factors (weather, location, lack of social support) and personal factors (pain, boredom, stress, too busy, insecure) are addressed with the Barriers Self-Efficacy Scale. Although it does not specifically address walking, the Self-Efficacy for Managing Chronic Disease Scale does include several constructs of the Social Cognitive theory contributing to self-efficacy. It includes symptoms, fatigue, and pain management, which refer to the personal factor, along with coping skills that affect the desired behavior. Communication with the healthcare provider can be viewed as expert advice and social support in the environmental realm. Other considerations are the acuity of the person’s disease state (ie, newly postoperative vs 8 months postoperative), which may affect self-efficacy and actual walking behaviors.

It would be reasonable to use an instrument that encompasses all of the key constructs of social cognitive theory and self-efficacy with walking as a measurable outcome for future research and practice for patients with PAD. The Barriers Self-Efficacy Scale includes the key concepts of social cognitive theory, even though it has not demonstrated predictive validity in this population. Predictive validity for this scale has been demonstrated for exercise in the female and middle-aged population. This instrument’s concept also is in line with the Social Cognitive Theory because it is task-specific. This would allow full evaluation with identification of potential explanations for success or failure for the chosen outcome. In the research setting, this will allow for determination of future research priorities and development of targeted and tailored interventions for self-efficacy for walking in the patient with PAD. In practice, overall health management and wellness can include walking for the person with PAD.

Methodological issues

An examination of methodological issues reveals four important findings with sample representation: (1) Few studies include individuals with PAD, (2) participants were mostly white, (3) the majority of participants were men, and (4) the mean age was 60 to 75 years. Because of the lack of studies that included individuals with PAD, CVD also was included. The current guidelines for an individual aged more than 50 years with atherosclerotic risk factors also should include PAD screening. If current guidelines are being followed, it can be assumed that the
population with PAD can, at a minimum, include individuals who are 10 to 20 years younger than the mean age of those in the sample. In addition, African Americans have a higher prevalence for PAD than do whites, whereas the prevalence of PAD in women continues to be understudied. This sample of studies was not representative of the population with PAD.

Some other limitations are the use of convenience sampling and small sample sizes of the included studies. Only one study had a sample size greater than 200, with the majority of studies having sample sizes that ranged from 24 to 90. Although several randomized controlled trials supported rigorous designs and methods, some were underpowered with small sample sizes of 24 to 32 participants. Suggestions for future research would include intervention studies that are adequately powered with rigorous designs. The descriptive studies have identified some potential mediator effects, such as depression, lack of social support, and pain in populations with PAD, which may warrant further study.

Few studies have been conducted on self-efficacy for walking in the individual with PAD. Studies that focused on self-efficacy-based interventions with patients who have experienced a coronary event or undergone coronary artery bypass grafting demonstrated an increase in self-efficacy, but this has not translated to an increase in walking. Insights as to why individuals stop walking are demonstrated, such as depression, pain, and lack of social support. This will allow for the development of meaningful evidence-based nursing interventions.

INSTRUMENTS

Psychometric issues

The strategies outlined in the psychometric toolbox for testing validity and reliability were used to appraise the psychometric properties of the measurement instruments. Examination of the instruments as reported in the samples revealed that only one instrument had undergone full psychometric testing for this specific population.

The Self-Efficacy Expectation Scale was the most tested instrument. Face validity was determined by four expert raters, which is subjective and minimally sufficient. Predictive and convergent validity are usually measured by Pearson moment correlation and considered valid with significant scores greater than $r = 0.45$. Allison and Keller concluded that assessment of self-efficacy for physical activity at the time of a cardiac event may not be a good predictor of future behavior. Convergent validity was not demonstrated with nonsignificant negative correlation in one small convenience sample. Most of these studies have been performed with older, white men with CVD. The Self-Efficacy Expectation Scale has demonstrated criterion validity in an updated version of the instrument in a white mostly male population. Further validity testing is recommended in the population with PAD for each of the instruments.

Reliability of internal consistency is usually reported as coefficient alpha or Cronbach’s alpha with reliable research tools scoring $\geq 0.70$. Reliability for each of the instruments and instrument subscales is acceptable and ranged from 0.70 to 0.99. The test-retest method was performed correctly by administering the tests 1 to 3 weeks apart, with a test reliability resulting in $r = 0.77$ for the Performance-Based Efficacy Scale and $r = 0.77$ for the Barriers Self-Efficacy Scale. These scales do not contain many items, so a reliability score closer to 0.70 is expected. There should not be an issue with the test-retest method because it was performed in participants who had not received an intervention. The reliability of the Self-Efficacy Expectation Scale, its subscales, and the other instruments in the sample have been appropriately demonstrated.

Feasibility

All of the instruments were pencil and paper scales that can be self-administered or in an interview format. This allows for ease of administration by mail, in person, or by telephone.

The Jenkins’s Self-Efficacy Expectation Scale is free to use with permission and proper recognition of the author. The full 62-item scale would take more time to complete than a scale with less items. There is reasonable concern related to participant burden in this older population with chronic disease. However, this is the one scale that can be divided into subscales that can be chosen for the specific activity.

The Self-Efficacy for Managing Chronic Disease Scale can be reproduced and used for no charge. Prior permission of the author is not required before using this instrument. It is a simple scale with fewer items. In addition to the pen and paper version, this scale also is offered in Internet format. Because many patients who present with calf cramping also have a high incidence of other chronic comorbidities that can also limit activity, it may not be possible for the instrument’s feasibility in length and administration is logical.

CONCLUSIONS

The use of the Self-Efficacy Expectation Scale, although frequently used in patients with CVD, has not been tested in patients with PAD. In cardiovascular studies, this scale has primarily been used in an older, mostly white population. Although the pathophysiology of atherosclerosis for CVD is similar to PAD, and the theory behind exercise for muscle efficiency is similar for CVD and PAD, the future testing of the instruments is suggested for validity in the appropriate population, including African Americans aged $\geq 50$ years with a diagnosis of PAD and an ABI $<0.90$. Cultural sensitivity of the instrument should be considered when assessing the population of interest.

Consideration could be given to alternative scales, such as the Self-Efficacy for Managing Chronic Disease Scale, with walking as the expected measurement outcome that encompasses dimensions of the self-efficacy construct of self-efficacy as posited by the Social Cognitive Theory. Use of the Self-Efficacy Expectations Scale in patient care may be considered with the same limitations of gender, race, and disease specificity. In direct care, these instruments could be used to evaluate the patient’s confidence to walk. This information could be used as part of a holistic assessment to personalize interventions, which will relate to improved outcomes in functional improvement as measured by distance and speed of walking ability. As the patient’s functional improvement occurs, claudication pain also should subside, removing a barrier to adherence to walking and, thus, resulting in a positive patient outcome.
Instruments used to measure self-efficacy for walking in the population with PAD have a role in practice and research. Once reliability and validity of the instruments have been demonstrated in this specific population, the role of confidence and evaluation of social cognitive interventions can be appropriately explored.

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20


Motivators and Barriers to Walking in the Older Person with Lower Extremity Peripheral Artery Disease

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Abstract

**Objective:** The purpose of this review is to provide, within the context of Social Cognitive theory, a current description of psychosocial and environmental factors that motivate or prevent a person with peripheral artery disease (PAD) from participating in activity.

**Background:** Factors that contribute to lack of activity have been explored in the elderly. A comprehensive review to explore motivators and barriers to walking in older people with PAD is necessary to guide development of interventions to increase activity.

**Methods:** Searched: PubMed, PsycINFO, Cumulative Index of Nursing and Allied Health Literature (CINAHL), OVID/Medline, and Cochrane from 2010-2016. Inclusion criteria: all study designs with samples of elderly with PAD.

**Results:** From the initial yield of 22 abstracts, and additional hand search, 8 publications were used for this review.

**Conclusions:** Social Cognitive Theory provided a context for understanding barriers and motivators to walking experienced by older adults with PAD. Nurses may contribute to walking self-efficacy with support and motivation.

Keywords: motivation, barriers, walking, physical activity, peripheral artery disease, intermittent claudication
Introduction

According to the most recent data, approximately 8.5 million Americans over the age of 40 years have peripheral artery disease (PAD) (Mozaffarian et al., 2015). The incidence of PAD is the same in men and women, and increases dramatically in both sexes as age advances (Criqui & Aboyans, 2015). PAD with intermittent claudication (IC) is described as cramping in the calf while walking and is indicative of insufficient blood flow to the lower leg muscles. Although PAD and cardiovascular disease (CVD) share the same risk factors (Criqui & Aboyans, 2015; Hirsch et al., 2006, Rooke et al., 2011), Smith, Shipley, & Rose demonstrated that PAD with IC is linked to increased mortality even when controlling for the presence of CVD (as cited in Criqui & Aboyans, 2015).

The American College of Cardiology/American Heart Association (ACC/AHA) guidelines recommend that persons with PAD receive education on the benefits of walking. As an initial, non-invasive treatment, the ACC/AHA guidelines endorse a supervised walking program that gradually increases in speed and distance (Hirsch et al., 2006, Rooke et al., 2011). Unfortunately, many individuals with PAD do not participate in any type of physical activity; they are unaware of the need to exercise, are not adhering to the proposed exercise guidelines, or worse, do not walk at all (Wolosker et al., 2003).

Prior research has revealed not just claudication pain, but other factors such as diabetes and depression may also discourage a person with PAD from participating in physical activity (McDermott et al., 2001). Psychosocial and environmental factors have been explored in the older adult population (Kaplan, Newsom, McFarland, & Lu, 2001; Carlson et al., 2012; King et al., 2005; Li, Fisher, Brownson, & Bosworth, 2005; Berke, Koepsell, Moredon, Hoskins, & Larson, 2012). However, few studies have examined motivators and barriers to walking in the
older adult with PAD. A comprehensive review of the literature to explore the motivators and barriers to walking is necessary to guide development of interventions to increase and sustain physical activity in this population, and to meet the recommended walking requirements within the ACC/AHA guidelines.

The purpose of this integrative review is to provide a current description of the psychosocial and environmental factors that motivate or prevent a person with PAD from participating in physical activity, within the context of Social Cognitive Theory (Bandura, 1986). The aims of this integrative review are to (1) identify and appraise the current level of evidence, (2) identify demographic characteristics and cardiovascular risk factors, (3) identify motivators and barriers to walking, (4) organize the findings into psychosocial (personal and behavioral) or environmental categories, and (5) explain how Social Cognitive Theory may assist in developing an appropriate intervention to enhance adherence to a walking program in the person with PAD.

Theoretical Framework

The concepts of Bandura’s Social Cognitive Theory (1986) were used to guide this review because of its explanation of social learning and attitudes that influence changes in behavior. Social Cognitive Theory is a learned behavior theory that includes three specific key concepts. These concepts are: (1) personal factors, which include biologic and emotional factors, and mechanisms by which a person learns; (2) behavioral factors which include modeling of the behavior, but also feedback after execution of the behavior; and (3) environmental factors including situational or physical barriers. The effect that each of these concepts has upon the other enhances learning and the learned behavior. As people gain more experience and confidence in their ability to accomplish the task, increased self-confidence ultimately leads to self-efficacy (Bandura 1986) (Figure 1).
An understanding of the motivators and barriers to walking in older adults is needed. The knowledge of motivators and barriers placed within the context of Social Cognitive Theory will help determine an appropriate intervention to enhance adherence to a walking program. This review focuses on motivators and barriers in adherence to a walking program that can be categorized into personal, behavioral, and environmental factors specific to older adults.

Materials and Methods

An integrative review following Whittemore and Knafl (2005) review strategy was conducted using the following databases: PubMed, PsycINFO, Cumulative Index of Nursing and Allied Health Literature (CINAHL), OVID/Medline, and Cochrane. The following search terms were used with the date ranges from 2010-2016: “motivation” OR “barriers to physical activity” AND “walking” OR “physical activity” OR “exercise” AND “peripheral arterial disease” OR “peripheral vascular disease” OR “diabetic vascular disease” OR “intermittent claudication”.

Search results and inclusion and exclusion criteria that guided the search are included in Figure 2. Abstracts were reviewed, and full publications were obtained for those which met inclusion criteria. The publications were further reviewed for appropriateness and selected for analysis. Data extraction was conducted using a standardized template that included purpose/research question, research design/level of evidence, sample, independent and dependent variable, data analysis, and results and implications headings. Table 1.

Quality of Evidence/Level of Evidence

For each publication, the quality of research methodology was evaluated using the Critical Appraisal Skills Programme (CASP) evaluation checklist. CASP is a method of critically appraising research evidence for quality, focusing on the validity of the study and usefulness of results. CASP provides guidelines for appraisal of all types of research, including systematic
reviews, as well as quantitative and qualitative research. The checklist consists of two screening questions regarding the aims and appropriateness of the methodology of the research. If the questions are negatively answered, the study does not meet the quality criteria to continue with evaluation. If the screening questions are positively answered, more in-depth evaluation of the study can continue. The remaining detailed questions are specific to the type of research design used, addressing topics such as recruitment strategies, homogeneity of the participant groups, randomization blinding, data collection, researcher/participant relationship, ethical considerations, rigor of the data analysis, clarity of findings, and value/applicability of the results. All of these questions are answered with a simple “yes”, “no”, or “can’t tell” response (Critical Appraisal Skills Programme, 2014).

Because an integrative review includes all types of study designs, the level of evidence for this review was assigned using the Level of Evidence pyramid by Melnyk and Fineout-Overholt (2011). Using the hierarchy of evidence designed by Melnyk and Fineout-Overholt (2011) the study is assigned a numerical value based on its design. The highest levels of evidence (Level I) are systematic reviews or meta-analysis studies, while the lowest level of evidence (Level VII) is expert opinion. Since integrative reviews can include qualitative studies, this hierarchy also includes qualitative or descriptive studies (Level VI). The assignment of level of evidence is not meant to be used alone, but it is meant to be used in conjunction with a framework (in this instance, CASP) to evaluate the quality of the evidence.

Search Results

A total of 22 abstracts were retrieved in the initial literature search. Of those, 10 were duplicates, and although one met inclusion criteria, it was a medication study, and therefore was excluded. An additional hand search was performed, which yielded one additional manuscript for
a total of eight that addressed motivators and barriers to walking in the PAD population. (Figure 2).

Results

All eight studies addressed the motivators and barriers to walking in the PAD population, which were further categorized into psychosocial or environmental factors related to the key concepts in Social Cognitive Theory.

Current Level of Evidence

As a whole, based on the CASP evaluation of the quality of evidence, all studies were of sound design with useful results. According to the hierarchy of evidence from Melnyk and Fineout-Overholt (2011), the level of evidence for studies in the current review ranged from level III to level VI, which is mid-low level of evidence. However, the nonexperimental or qualitative evidence is fitting for this type of research question. Two studies were exploratory qualitative interview studies, consisting of individual interviews and focus groups that described the patient experience, and one study explored guided communication between the patient and healthcare provider. The remainder of the studies were non-experimental descriptive studies that described the motivators and barriers to walking, including physical (pain, co-morbid conditions, fatigue), psychosocial (emotional, commitment, motivation) and environmental issues. See Table 1.

Demographic Characteristics

The studies reflect international representation as evidenced by the locations of research. The majority of studies were conducted in South America (Barbosa et al., 2015; Cavalcante et al., 2015; Farah et al., 2013). Three studies were conducted in North America (Barnes, Curran, Lunos, Ahluwalia & Collins, 2010; Collins, Kroll, Krueger, Wilson, Ashton, & Sharf, 2006; Galea & Bray, 2007), and of those, two studies were conducted in the United States (Barnes,
Curran, Lunos, Ahluwalia, & Collins, 2010; Collins, Kroll, Krueger, Wilson, Ashton, & Sharf, 2006). The remaining two studies were conducted in European countries (Egberg, Andreassen, & Mattiasson, 2012; Muller-Buhl, Engeser, Leutgeb, & Szecsenyi, 2012).

All of the study participants had some degree of PAD with or without claudication. The age of the study participants ranged from 55.5 - 81 years. Although all studies included both sexes, the majority of the participants were men. Only three studies reported the ethnicity of participants. Of those studies, the majority of participants were White (Barnes, Curran, Lunos, Ahluwalia & Collins, 2010; Cavalcante et al., 2015; Galea & Bray, 2007). However, one study reported 39% of participants were non-White (Cavalcante et al., 2015). Additionally, one study conducted in the United States reported White (n=14), African American (n=12), and Hispanic participants (n=9) (Collins, Kroll, Krueger, Wilson, Ashton, & Sharf, 2006). The studies conducted in Europe (Egberg, Andreassen, & Mattiasson, 2012; Muller-Buhl, Engeser, Leutgeb, & Szecsenyi, 2012) and two of the studies conducted in Brazil did not report ethnicity of participants (Barbosa et al., 2015; Farah et al., 2013).

Educational background of participants varied from elementary education (8 years or less) (Barbosa et al., 2015; Cavalcante et al., 2015) to 11 years of school (Cavalcante et al., 2015) and to some college education (Barnes, Curran, Lunos, Ahluwalia & Collins, 2010). Two studies reported low income (Barbosa et al., 2015; Cavalcante et al., 2015), and three studies reported marital status (Barnes, et al., 2010; Galea & Bray, 2007; Cavalcante et al., 2015).

In addition to PAD, several risk factors and co-morbid cardiovascular conditions were documented in these studies. Diabetes, hypertension, (Farah et al., 2013; Cavalcante et al., 2015; Barbosa et al., 2015), heart disease (Barbosa et al., 2015; Cavalcante et al., 2015), dyslipidemia, and being overweight (Cavalcante et al., 2015) were prevalent among participants in these
studies. The participants also had very poor circulation as demonstrated by their ankle-brachial index (ABI) (Barbosa et al., 2015; Farah et al., 2013). Smoking was also prevalent in participants across studies (Barbosa et al., 2015; Cavalcante et al., 2015; Galea & Bray, 2007; Farah et al., 2013).

Motivators and barriers to walking

Personal Factors

Co-morbid health issues were identified as potential barriers to walking in the person with PAD such as diabetes associated with lack of energy and other medical conditions (Cavalcante et al., 2015). Other disease such as abdominal obesity and health conditions are also significant factors as reported in Barbosa et al., (2015). Metabolic syndrome components and diabetes are associated with physical activity (Barbosa et al., 2015) while in Farah et al., (2013) a prediction model demonstrated that diabetes and diabetes and coronary artery disease (CAD), along with Walking Impairment Questionnaire (WIQ) scores, predict walking distance and claudication distance.

Other personal factors that may relate to lack of physical activity are age because physical activity is negatively associated with age and fear of falling (Barbosa et al., 2015). Low economic status was also found to be associated with fear of falling (Cavalcante et al., 2015). Additionally, Barbosa et al., (2015) reported lack of finances and lack of knowledge as barriers affecting physical activity.

Although none of the studies explored depression as a potential barrier to physical activity in the persons with PAD, Egberg, Andreassen, and Mattiasson (2012) addressed some of the feelings expressed by this population with IC, such as feeling inconvenient when forced to stop walking and uncomfortable when needing to rest. The participants also expressed that they
missed their former life, experienced sadness, and avoided social outings and physical activity all because of leg pain. The positive aspect of the feelings of sadness and isolation led the participants to adapt and integrate adjustments for IC in daily activities. Alternatively, in other studies, participants reported positive attitudes, perceived control and intentions to exercise (Galea & Bray, 2007) and some did participate in other physical activity (Muller-Buhl, Engeser, Leutgeb, & Szecsenyi, 2012). These positive attitudes, in turn, influenced behavioral factors.

**Behavioral Factors**

The person’s physical ability, as related to the ABI, results in negative physical feedback (pain and fatigue). Although one study found that pain did not factor into intent to walk (Galea & Bray, 2007), Cavalcante et al., (2015) reported that decreased walking capacity was associated with leg pain. Barbosa et al. (2015) reported that pain was a factor in 75% of the participants, and 64% needed to rest because of leg pain, while that same study reported that claudication onset distance and need to rest due to leg pain were significant barriers to physical activity. The finding of pain resulting in the inability to participate in physical activity - along with fatigue associated with pain, especially when carrying extra weight or navigating stairs or hills - was echoed by findings from the study conducted by Egberg, Andreassen, & Mattiasson (2012).

Fatigue (Cavalcante et al., 2015; Barbosa et al., 2015), lack of energy, and diabetes (Barbosa et al., 2015) were reported by participants as an issue with participating in physical activity. Specifically, in one study, 34% of participants immediately declined the invitation to exercise due to fatigue and lack of motivation, and of the 8% who did not complete the study, 59% reported lack of motivation as the reason for attrition (Muller-Buhl, Engeser, Leutgeb, & Szecsenyi, 2012). Other barriers affecting physical activity identified by Barbosa et al. (2015) are lack of monitoring of adherence to an exercise program and lack of time.
Environmental Factors

Environmental factors may include physical factors of the environment or social factors (social support). Barbosa et al. (2015) found a significant list of physical environment barriers to walking such as physical obstacles that aggravate leg pain, difficulty moving, no accessible exercise site, lack of security, poor sidewalks, streets not flat, no crosswalks, traffic, inclement weather, with the most significant barrier being no place to sit for rest/recovery and lack of green space. Of these findings, physical activity was negatively associated with lack of green space (Barbosa et al., 2015). Cavalcante et al. (2015) also found lack of green space to be a barrier to walking, while others chose not to participate in physical activity because of the lengthy travel distance to get to a place to walk (Muller-Buhl, Engeser, Leutgeb, & Szecsenyi, 2012). However, study participants did have the self-confidence to adjust to overcome environmental barriers. According to Egberg, Andreassen, and Mattiasson (2012), they identified need for planning ahead to secure transportation to the exercise site and to know safe areas to sit for rest/recovery as well as continuous adjustments to ensure awareness of the environment.

Motivators

Rewards, commitment to exercise, and perceived control all contributed to motivation to participate in physical activity. Barnes et al. (2010) found that persons who were actively participating in exercise were significantly different from persons in the pre-contemplation/contemplation stage of participating in physical activity regarding problem solving exercise alternatives and rewarding themselves for adherence. Additionally, all groups were statistically different when assessed for commitment to exercise. The pre-contemplation group was statistically different from the action group when it came to decisional balance regarding the positives and negatives of changing behavior and enjoyment of physical activity.
(Barnes, et al., 2010). Furthermore, Egberg, Andreassen, and Mattiasson (2012) noted that because older persons needed assistance to balance themselves while walking, having an exercise partner made physical activity easier, and encouragement from healthcare providers motivated the person with PAD to walk even though the individual was experiencing pain.

Discussion

Within the context of Social Cognitive Theory, personal/psychosocial, behavioral, and environmental factors have been identified that contribute to motivation and barriers to physical activity. Barriers to walking in the older person with PAD include low socioeconomic class, age, co-morbid conditions, pain, fatigue, no place to rest while walking, and lack of social support. However, with social support and motivation, barriers to walking can be overcome and self-efficacy can be achieved.

In a predominantly white, male population with PAD, older age and presence of co-morbid conditions, such as diabetes and coronary artery disease result in lack of motivation. Lack of interest in physical activity is a similar finding in a sample of adults between 65-100 years (Gellert et al., 2015) and in the diabetic population (Clarke et al., 2015). In addition to poor physical health, mental health conditions, and lower socioeconomic status influenced both intention to exercise and self-confidence in older adults (Sniehotta, Gellert, Witham, Crombie, & McMurdo, 2013). Middle aged and older people with diabetes reported high cost of gym memberships as a barrier to exercise (Clarke et al., 2015; Lascar et al., 2016). It has been suggested that struggles of the lowest socioeconomic group may not benefit from a Social Cognitive Theory based intervention as much as those in higher socioeconomic groups (Sniehotta et al., 2013). These demographic findings describe Social Cognitive Theory’s personal factors that negatively influence self-efficacy. However, Wu, Chang, Courtney, and
Kostner (2012) demonstrated in older cardiac patients with diabetes, that with education and/or social support, knowledge and self-efficacy can be improved.

The behavioral factors of pain, fatigue, fear of falling, and need to rest while walking culminate in lack of motivation. Pain has been reported in other populations that suffer from chronic conditions such as diabetes (Labrunee et al., 2012), and pain, fatigue and fear of falling were reported in the chronic kidney disease population as barriers to walking (Clarke et al., 2015). The same barriers of lack of knowledge, lack of monitoring of activity, and lack of time were echoed in patients with diabetes (Labrunee et al., 2012). However, individuals with chronic illness do want exercise education (Clarke et al., 2015; Lascar et al., 2016). Lascar et al., (2016) reported that individuals wanted education provided by a fitness expert, while Clarke et al., (2015) reported no preference for who provided the education. Individuals also want monitoring of activity, preferably weekly (Labrunee et al., 2012).

With increased social support, motivation, commitment, and support from a health care provider, pain was not a barrier for most study participants, with one exception. While health care provider support in goal setting and social support from peers were seen to be beneficial (Clarke et al., 2015; Lascar et al., 2016, Kahn, Stephens, Franks, Rook, & Salem, 2013), individuals with arthritis did not increase physical activity despite support from healthcare providers (Peeters, Brown, & Burton, 2015). Previous studies also found that once self-efficacy was achieved, social support was not important (Sniehotta et al., 2013; Phillips & McAuley, 2013), suggesting that long-term support may not be needed. However, social support in the form of an exercise partner does provide a sense of security and safety (Lascar et al., 2016).

Environmental factors such as lack of green space including safe streets and disagreeable weather are barriers to physical activity for the person with PAD, especially the elderly with low
income and less than eight years of formal education (Barbosa et al., 2015; Cavlacante et al., 2015). Bad weather was echoed as a barrier to exercise by individuals with Type 1 diabetes (Lascar et al., 2014). Likewise, people with chronic kidney disease found exercising outdoors was more rewarding, so bad weather was seen as a deterrent (Clarke et al., 2015). However, in the older patient with good physical and mental health, and a higher economic status, safety and weather are not significant barriers once self-efficacy is achieved (Sniehotta et al., 2013).

Findings of Gellert et al., (2015) support lack of access and safety as barriers to exercise. An understanding of the motivators and barriers to walking in the population with PAD and placed within the context of Social Cognitive Theory can help determine an appropriate intervention to enhance adherence to a walking program in the person with PAD. (Figure 3.)

Nursing Implications

As suggested for the older population (White, Wojcicki, & McAuley, 2012), breast cancer survivors (Phillips & McAuley, 2013; Stacey, Chapman, & Lubans, 2016), and chronic kidney disease population (Clarke et al., 2015), taking into consideration the identified motivators and barriers, development of a walking intervention for the person with PAD and IC using the Social Cognitive Theory may be beneficial (McDermott et al, 2013). As many patients with PAD are not optimized on a medical regimen (Montiminy et al., 2016), a walking program’s framework should include education and treatment of PAD and risk factors (smoking cessation, medical treatment), control of co-morbid factors and psychological issues such as depression, pain control, physical and psychosocial support (walking partner, treatment of depression), positive feedback, and accessible indoor/outdoor safe places to walk with access to rest areas. An inter-professional plan including medical management of the disease, education (Tew et al., 2015), and a nurse-led home/community walking program may be successful (Mays
et al., 2015, Gardner et al., 2011). The nurse can assist in accessing a safe place to walk within the person’s community and provide social support and positive feedback communication. Once self-efficacy for walking has been achieved, the nurse can continue to monitor the person to ensure continued adherence to a walking program.

Conclusion

Although persons with PAD are a diverse population with respect to physical activity, the use of Social Cognitive Theory provided a context in which a better understanding of the barriers and motivators to walking, experienced by older adults, will inform nursing practice. Nurses caring for older individuals with PAD may contribute to success with promotion of tailored education and problem-solving methods specific to aging in which motivational methods, and social support may help improve adherence to a walking program, and contribute to enhanced self-efficacy related to walking. Furthermore, using this supportive framework, nurses can impact prevention efforts to slow the progression of PAD to reduce symptoms and disability. Research is needed to assess how such nursing support can affect patient recovery and clinical outcomes in this patient population.
Figure 1. Social Cognitive Theory
**Inclusion Criteria**

- All research design types (quantitative and qualitative)
- Sample includes persons with PAD aged 65 years and older

**Exclusion Criteria**

- People with diabetes without PAD
- Dissertation, proposal without results, instrument reviews, medication studies
- Manuscript not available in English

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**Figure 2. Search results**
Figure 3. Motivators and Barriers