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Research Paper

Development of the Barriers to Physical Activity Questionnaire for People with Mobility Impairments

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Abstract

Background: Despite the widely known benefits of physical activity, people with disabilities are more likely to be inactive when compared to people without disabilities. Previous questionnaires that measure barriers physical activity for people with disabilities do not measure barriers from an ecological perspective.

Objective: The purpose of this study was to develop the Barriers to Physical Activity Questionnaire for People with Mobility Impairments (BPAQ-MI) that measures barriers using an ecological framework.

Methods: This study consisted of two phases. In Phase one, developed the content validity by (a) developing an item bank, (b) identifying missing items and combining items using a Delphi panel, and (c) refine item wording via cognitive interviews. In Phase two, people with mobility impairments took part in in-person interviews to establish test-retest reliability, internal consistency, and construct validity of the BPAQ-MI.

Results: Exploratory factor analysis revealed the BPAQ-MI was comprised of eight subscales or factors: health; beliefs and attitudes; family; friends; fitness center built environment; staff and policy; community built environment; and safety. The BPAQ-MI demonstrated very good test-retest reliability. Cronbach's alpha ranged from 0.792 to 0.935. The BPAQ-MI showed significant negative correlations with exercise (minutes/week) and significant positive correlations between BPAQ-MI subscales and inactivity (hours/day).

Conclusions: The BPAQ-MI is the first questionnaire that places greater equity at measuring barriers to physical activity across the intrapersonal, interpersonal, organizational, and community domains. The BPAQ-MI has the potential to assist researchers in understanding the complex relationship between barriers and ultimately develop physical activity interventions that address these barriers.

Keywords: Disabled persons; Physical activity; Exercise; Barriers; Questionnaire

Despite the many health benefits of physical activity,[1] people with disabilities are more likely to be physically inactive (47.1% vs. 26.1%)[2] or have lower physical activity participation rates (14.7% vs. 34.8%)[3] compared to people without disabilities. This disparity in physical activity may be explained by the relationship between individuals with disabilities and their environments.

Human ecological models have examined the interactions by structuring the individual and the environment into four domains of influence (Fig. 1) that include: *intrapersonal* influences, which operate at the personal level and involves health, attitude, and impairment; *interpersonal* influences, which involves social relationships with family, friends, and professionals; o*rganizational* influences, which includes attributes of institutions within the community, such as programs and staff; and *community* influences, which involve community-at-large variables such as public transportation and the built and natural environment.[4,5]

There are barriers to physical activity for people with mobility impairments across all four ecological domains. The most common barriers to physical activity include attitudes and beliefs towards physical activity held by people with mobility impairments, their friends, and their family members,[6–10] built environment features of fitness

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centers,[11–13] and community features such as safety and the built environment.[14–17]

Seven questionnaires have been used in the measurement of perceived barriers to physical activity for people with mobility impairments. All seven questionnaires had at least 51% of their items within one ecological domain.[6,18–23] Two questionnaires measured barriers within all four ecological domains[21,22]; however the majority of items were within the intrapersonal domain.

The purpose of this manuscript is to describe the development and psychometric properties of a Barriers to Physical Activity Questionnaire for People with Mobility Impairments (BPAQ-MI) that places approximately equal weight across the four ecological domains.

Methods

There were two phases in this study. Phase I was used for content validity, item development, and item refinement, and Phase II was used for measuring criterion validity, internal consistency, and test-retest reliability. This study was approved by the Institutional Review Board from a large, metropolitan university. Informed written, consent was obtained from all participants.

Phase I: content validity

Phase Ia: Item bank development

An extensive review of several databases (e.g., MEDLINE and Cumulative Index to Nursing and Allied Health Literature) was conducted to identify both qualitative and quantitative studies that employed questionnaires to identify barriers to physical activity for people with diverse mobility disabilities (e.g., people with arthritis, cerebral palsy, or multiple sclerosis). In order to sample the widest possible range of barriers, both medical subject headings and natural language were used. In order to minimize bias to barrier identification, barriers were included in the item bank if they were identified from qualitative focus groups or interviews, quantitative surveys, or existing questionnaires measuring barriers to physical activity. Questionnaire items that measured multiple topics were split into separate items. For example ''Lack of support from friends or family'' was separated into two distinct questionnaire items: ''Lack of support from friends'' and ''Lack of support from family.''[6–9,11,18,20–58] The authors have experience promoting physical activity, measuring physical activity barriers, and developing questionnaires. They conceptually categorized the items into the four ecological domains: intrapersonal, interpersonal, organizational, and community.

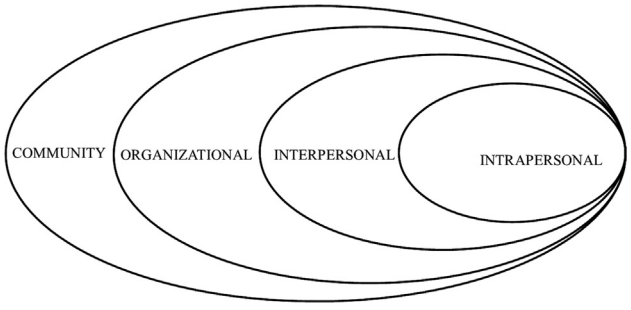

Fig. 1. Ecological framework of health promotion.

Phase Ib: Delphi

The Delphi technique was developed by the Rand Corporation in the 1950s and seeks convergence on a topic from a panel of experts.[59–62] The Delphi technique is widely used for gathering information from experts of specific topics. For the purposes of this study, convergence pertained to identifying barriers to physical activity within each domain of the ecological model. The Delphi technique was selected because it allowed panelists to work independently of one another while providing constant feedback amongst panelists to generate new information and clarify old information from previous iterations.

Delphi panelists should be highly knowledge on a subject matter.[59–62] The inclusion criteria for panelists in this study were that they had peer-reviewed journal articles on either physical activity promotion or measurement of physical activity barriers for people with disabilities. The authors partnered with potential panelists on other studies and programs. The authors reviewed the curriculum vitae for each potential panelist to judge their level of expertise based on the inclusion criteria. The potential panelists had at least ten years of experience at promoting physical activity or measuring barriers to physical activity for people with disabilities. A convenience sample of 15 potential panelists were emailed an information sheet explaining the study and how their expertise could develop a Barriers to Physical Activity Questionnaire. Potential panelists emailed the primary author any question they might have had. The potential panelists consented to being a Delphi panelist by responding via email.

While there is no consensus on how many iterations/rounds are needed, it has been generally accepted that three rounds is sufficient to gather enough information to reach consensus.[60] In round one, panelists were emailed the item bank and asked to add items that were missing. New items were added without changing any wording. In round two, panelists emailed the updated item bank and asked to combine or remove redundant items. Panelists were asked to provide a reason for why they felt items ought to be combined. Finally, in round three, panelists were asked whether each item should be kept or removed. Items were combined or removed in rounds two and three if there was 70% agreement across panelists. Panelists had two weeks to respond for each round.

Phase Ic: cognitive interviews

Cognitive interviews were conducted with 10 individuals with mobility impairments, which is a typical number