Original experimental

Initial validation of the exercise chronic pain acceptance questionnaire

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HIGHLIGHTS

- An exercise-specific chronic pain acceptance questionnaire (CPAQ-E) is tested.
- The CPAQ-E demonstrated acceptable face validity, factor structure and reliability.
- The CPAQ-E predicted future bouts of planned exercise behaviour in this sample.

ARTICLE INFO

ABSTRACT

Background and aims: Pain acceptance, measured by the chronic pain acceptance questionnaire (CPAQ), is related to exercise adherence for those with arthritis. The CPAQ measure has 20 items comprising two subscales – pain willingness and activities engagement about pursuing "valued daily activities" despite pain. However, exercise is not specified as a valued activity and respondents may be considering other activities raising generalizability and strength of prediction concerns.

Methods: Accordingly, a modified CPAQ solely for exercise (CPAQ-E) was developed to heighten salience to pursuit of exercise in the face of pain. An exercising sample with arthritis ($N = 98$) completed the CPAQ-E at baseline and exercise 2 weeks later. Exploratory factor analysis of the CPAQ-E was performed using Mplus. Regression was used to predict exercise.

Results: Analysis revealed a two-factor, 14 item model with good psychometric properties reflecting pain willingness and activities engagement subscales ($\chi^2 = 85.695$, df = 64, $p < .037$; RMSEA = .055; CFI = .967; TLI = .954). Both subscales and the total score positively predicted future weekly exercise bouts (range ps from < .05 to <.001). Activities engagement predicted future weekly exercise volume ($p < .05$).

Conclusions: This study offers preliminary support for the factorial and predictive validity of the CPAQ-E among exercising individuals with arthritis.

Implications: This measure could help researchers increase the specificity and sensitivity of pain acceptance responses to exercising among individuals with arthritis. A more sensitive measure might help clinicians interpret patient responses to exercise for pain self-management.

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1. Introduction

Physical activity has been recommended as self-management for people with all types of arthritis (e.g., osteoarthritis, rheumatoid arthritis.) by both arthritis and public health advocates. They agree that those with arthritis of all types pursue the same goal of 150 min of moderate to vigorous physical activity (MVPA) to obtain multiple health benefits [1–3]. However, few people with arthritis meet this guideline [2]. Studies have identified *pain acceptance* as one potentially helpful psychological correlate in understanding adherence to MVPA [4,5].

What is pain acceptance? Pain acceptance describes a psychological factor that means some individuals acknowledge their pain, discard unproductive means of controlling pain, reject the notion of pain as equivalent to disability, and pursue their valued activities despite pain [6]. The chronic pain acceptance questionnaire (CPAQ) is a measure of pain acceptance [7] that has been developed and validated in chronic pain populations. However, the CPAQ is phrased generally and does not draw respondents' attention to specific valued activities (e.g., exercise) in answering the CPAQ items.

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To explore which activities people had in mind when answering the CPAQ, secondary analysis [8] of a larger arthritis exercise barriers investigation was conducted. Following completion of the CPAQ, exercising individuals with arthritis were offered examples of activities (e.g., employment, social, hobbies, household care, exercise, etc.) and they indicated whether each was considered when answering the CPAQ. On average, respondents considered 4 activities which they rated on a 0 (*Do not value at all*) to 10 (*Value very highly*) scale, with most of these personally selected activities being highly endorsed. Based on this analysis, these respondents to the original CPAQ concurrently considered many activities and were not exclusively focussed on exercise despite the fact that they were somewhat active and endorsed exercise as valued. Thus, when using the global CPAQ scores to correlate with exercise-specific variables, the correlation may not be a true reflection of the pain acceptance expressed if individuals were focussed on exercise alone.

The author of the original CPAQ was contacted [9] regarding a potential exercise modification and agreed it should be pursued, and did not foresee any reduction in validity if modifications were made. There is also precedent for successful CPAQ modification for other purposes and populations such as a short form [10] and a modification for adolescents [11].

1.1. Objectives and hypotheses

The present study had two related measurement objectives concerning factorial and predictive validity relative to the exercise-oriented version of the CPAQ, hereafter called the CPAQ-E. The first concerned examining the factorial validity of the CPAQ-E.

The second objective concerned the CPAQ-E's predictive utility and assessed whether the CPAQ-E or its subscales would predict future MVPA.

2. Methods

2.1. Participants and design

The study design was prospective, observational. Ninety-eight adults with self-reported, medically-diagnosed arthritis completed surveys at baseline and two weeks later. To participate, the following eligibility criteria were met: (a) 18 years of age or older, (b) residents of Canada or the United States, (c) report doing at least one bout of planned physical activity in the past 4 weeks lasting 15 min or more, (d) report having medically-diagnosed arthritis.

2.2. Measures

Pain acceptance for exercise. Pain acceptance was assessed using an exercise-oriented modification of the CPAQ [7] called the CPAQ-E. The original 20-item CPAQ is comprised of 2 subscales (pain willingness and activities engagement) and can also be interpreted as a total score. The CPAQ-E specified the wording of each original item to focus respondents' attention on exercise behaviour. A sample item from the pain willingness subscale is "I need to concentrate on getting rid of my pain before I can exercise" (originally "I need to concentrate on getting rid of my pain"). A sample from the activities engagement subscale is "I am getting on with my exercise plans no matter what my level of pain is" (originally "I am getting on with the business of living no matter what my level of pain is"). Participants rated each item in terms of how true it was for themselves on a 0 (*never true*) to 6 (*always true*) response scale. As with the original measure, CPAQ-E items in the pain willingness scale were reverse scored and summed while the activities engagement items were summed. The total CPAQ-E score was calculated by summing the 2 subscales. Higher scores on both subscales and for the total score represent higher pain acceptance, up to a maximum score of 114. The CPAQ has been validated in chronic pain populations [7] with good internal consistency and the CPAQ-E was internally consistent in the present study (Cronbach's $\alpha = .92$).

Physical activity. Participants reported the average weekly frequency and duration over the past two weeks of *planned bouts* of moderate and vigorous activity lasting at least 15 min. Total weekly planned PA volume was calculated in a manner consistent with public health recommendations and previous work on PA and arthritis [2,12,13]. Definitions of moderate and vigorous activity were provided to participants. Moderate activity was defined as "...*makes your heart beat faster and makes you breathe a little harder. You can talk easily while doing moderate activity, but you may not be able to sing comfortably. On a scale from 0 to 10, where sitting is 0 and the highest level of effort possible is 10, moderate exercise is a 5 or 6. Vigorous activity was defined as "... makes your heart beat much faster. You may not be able to talk comfortably without stopping to catch your breath. On a scale of 0 to 10, where sitting is 0 and the highest level of effort possible is 10, vigorous activity is a 7 or 8.*"

Activity bouts of less than 15 min were not assessed because the present study focused on *planned activity* that required self-regulation. This is in contrast to unplanned, shorter incidental bouts. Planned bouts of longer duration have also demonstrated better recall and are self-reported with higher accuracy than unplanned, incidental short duration bouts of activity [14]. In the present study, pain-related beliefs about *planned MVPA* was used to predict the correspondent planned MVPA bout frequency and minutes (i.e., volume). What is being self-regulated is the time individuals take to complete a given bout of either moderate and/or vigorous activity in excess of 15 continuous minutes. Therefore, the total volume of planned PA per week was calculated with a focus on minutes of either kind of activity as defined in the measure's instructions. Accordingly, weekly moderate activity (frequency × duration) and weekly vigorous activity (frequency × duration) were summed for total volume. Frequency represented the number of planned weekly bouts of MVPA and this was used as an additional behavioural indicant of exercise.

2.3. Procedures

Upon obtaining approval from the University Behavioural Research Ethics Board, web-based study announcements were used to recruit the study sample. These announcements included a link to the online survey and were posted to arthritis newsletters and to national arthritis organisations' official websites (e.g., the Arthritis Society, local chronic disease programme, etc.). Announcements were also posted to social media pages of these organizations (e.g., Facebook, Twitter).

At the onset of the online survey, participants were required to complete the electronic consent form. After answering questions pertaining to eligibility criteria, participants completed the 20–30 min survey, which included the CPAQ-E. A link to the brief follow-up survey consisting of the exercise measure was sent by email two weeks later to those participants who provided their permission.

2.4. Data management and analytical plan

Analyses were performed using SPSS version 23 and Mplus. Data were screened for outliers and for missing data. Mean item score replacement for a given individual was used for an individual's scales that were missing a single item [15]. A small number of participants reported either the days or minutes of exercise ($n = 2$) and one was missing both. A conservative strategy was utilized for replacing the missing MVPA data whereby the lowest possible answer was inserted (i.e., 1 day, or 15 min – if minutes were