Journal of Science and Medicine in Sport 18 (2015) 558–564

Contents lists available at ScienceDirect

Journal of Science and Medicine in Sport

journal homepage: www.elsevier.com/locate/jsams

Original research

Psychosocial factors associated with increased physical activity in insufficiently active adults with arthritis

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ARTICLE INFO

Article history:
Received 16 October 2013
Received in revised form 30 June 2014
Accepted 8 August 2014
Available online 15 August 2014

Keywords:
Psychology
Social cognitive theory
Exercise
Osteoarthritis
Rheumatoid arthritis

ABSTRACT

Objectives: Although physical activity can potentially reduce symptoms of arthritis, 50% of people with arthritis are insufficiently active. The aim was to identify psychosocial factors associated with increased physical activity in mid-age adults with arthritis who did not meet recommended physical activity levels.
Design: Longitudinal cohort study.
Methods: Data were from 692 insufficiently active men and women (mean age 55 ± 6.6 years) with arthritis, who answered mailed surveys in 2007 and 2009 in the HABITAT study. Increased physical activity was defined as a change of ≥200 MET min/week in walking, moderate and vigorous activities from 2007 to 2009. Scale scores were used to measure psychosocial factors including intention, experiences, attitudes, efficacy, barriers, motivation, social support, and health professional advice. Associations between (1) 2007 psychosocial factors and (2) 2007–2009 improvement (≥+1 standard deviation) in psychosocial factors and increased physical activity were examined with logistic regression models. Results were adjusted for education, body mass index, and self-rated health.
Results: Between 2007 and 2009, 296 participants (42.8%) increased their physical activity. Engagement, mastery and physical activity intention in 2007 were associated with this increase in physical activity (engagement OR = 1.11, 99% confidence interval (CI) = 1.05–1.17; mastery OR = 1.12, 99%CI = 1.02–1.22; physical activity intention OR = 1.29, 99%CI = 1.06–1.56). Improved scores for encouragement (OR = 2.07, CI = 1.07–4.01) and self-efficacy (OR = 2.27, CI = 1.30–3.97) were also significantly associated with increased physical activity.
Conclusions: Positive physical activity experiences and intentions were predictors of increased physical activity among people with arthritis. Improved physical activity confidence and social support were associated with increased physical activity. It is important to consider these psychosocial factors when planning physical activity interventions for people with arthritis.

1. Introduction

Arthritis is one of the most prevalent and disabling chronic conditions in late adulthood worldwide. The most prevalent symptoms are joint pain and stiffness, resulting in difficulties with daily activities.[1] Physical activity (PA) has the potential to reduce these symptoms,[2] however, as in the general population, only about 50% of the people with arthritis are sufficiently active.[3]

Focus groups with arthritis patients reveal that a variety of physical, psychological, social and environmental factors are associated with PA.[4,5] While adults with arthritis are known to experience condition-specific barriers, such as pain and stiffness and fear of increasing symptoms,[6,7] little is known about the psychological and social factors that influence PA in this group. Social cognitive theory purports that cognitive processes and behavioural and environmental factors are important determinants of physical activity.[8] Cognitive processes include self-efficacy (i.e. confidence), outcome expectations (e.g. anticipated beneficial effects), motivating factors, and intentions. Behavioural factors include skill and past experiences. Environmental factors include social support such as professional advice, social encouragement and assistance. To plan effective interventions, it is imperative to understand determinants of PA.

A recent systematic review on correlates of PA in adults with rheumatoid arthritis found positive cross-sectional associations between PA and motivation, self-efficacy and health perception.[9] Studies among adults with other or unspecified types of arthritis found that people who perceive a need to be active, who do

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http://dx.doi.org/10.1016/j.jsams.2014.08.003
1440-2440/

not perceive it as a demand, who have positive self-efficacy and a strong intention to do physical activity, are likely to be active.[7,10–12] Barriers to PA are similar to those seen in the general population, and include, for example, poor health, old age, weight lack of time and work demands.[7,10] However, these quantitative studies were cross-sectional in design. To our knowledge there have been no prospective studies of the psycho-social determinants of PA in people with arthritis.

The overall aim of this study was to therefore to identify the psychosocial factors associated with increases in PA observed over two years in mid-age adults with arthritis who did not meet recommended PA levels.[13] The first objective was to identify the predictors of the observed increases in PA, and the second objective was to examine associated changes in psychosocial factors, over the two year period.

2. Methods

This study was based on data from the 2007 and 2009 HABITAT (How Areas In Brisbane Influence health And activity) surveys.[14] HABITAT is a multi-level cohort study of PA and associated sociodemographic, psychological, social, environmental, and area-level factors, in adults aged 40–65 years. The design and recruitment procedures have been described in detail elsewhere.[14] Ethical clearance was awarded by the Queensland University of Technology Human Research Ethics Committee (3967H). Survey return was taken as informed consent. In summary, 1625 Census Collection Districts (CCDs) in Brisbane, Australia, were ranked by their index of relative socioeconomic disadvantage score, categorised into deciles, and 20 CCDs from each decile were selected to provide 200 local areas for study inclusion. From each of the 200 CCDs, dwellings with individuals aged between 40 and 65 years in 2007 were identified using electoral roll data, and approximately 85 people per CCD were selected to participate in 2007 (N = 17,000). The 2007 respondent sample (N = 11,036, 65%) was broadly representative of the wider population.[15] Of the 7867 (74%) participants who additionally returned the 2009 survey, 1839 (23%) participants reported having arthritis. Of this subsample, 733 (40%) were insufficiently active (i.e. <500 MET min/week, equivalent to 150 min of moderate intensity PA per week)[13] and data from 692 of these participants with complete PA data were included in the analyses (Appendix 1).

In both surveys, PA was assessed using items from the Active Australia survey, which have been found to have moderate test–retest reliability (ICC ≥ 0.56) and concurrent validity against accelerometer data (r = 0.52).[16] Participants reported the frequency and duration of walking briskly (for recreation, exercise, or to get to and from places), and of moderate and vigorous PA (excluding housework and gardening) during the last week. Examples of moderate activities included gentle swimming, social tennis, and golf. Vigorous activities were defined as "activities that make you breathe harder or puff and pant"; examples included jogging, cycling, aerobics, and competitive tennis. A PA score was derived by multiplying the time spent doing these activities (min/week) by metabolic equivalent (MET) scores which reflect the average intensity of the activities in that category: 3.33 for walking briskly and moderate activities, and 6.66 for vigorous activities. To estimate total PA, MET min/week spent walking briskly, and doing moderate and vigorous PA were summed. If the total time exceeded 2400 min/week (40 h) the times spent in each of the categories were proportionally reduced to a maximum of 2400 min/week. 'Increased PA' was defined as an increase of ≥200 MET min/week (equivalent to 1 h of walking or at least moderate intensity activity) between 2007 and 2009.

Psychological and social factors were quantified using questionnaire scales adapted from previous work that demonstrated acceptable levels of validity and internal reliability.[17] With the exception of health professional advice that used a yes/no dichotomy, all items were scored using a five point Likert scale, and scores were summed across relevant items so that higher scores indicated higher levels of each variable. A summary of these variables, including the construct, questionnaire items, number of scale items, potential score range, and internal reliability coefficients for the current sample is provided in Appendix 2.

As minimal important change values, for the psychosocial factors are not available, the definition of 'improvement' was based on statistical arguments that could be used consistently across the factors. Thus, for each of the psychosocial factors (except health professional advice), participants were classified as 'improved' on that factor if they scored at least 1 standard deviation (of the 2007 score) higher on the 2009 than the 2007 survey, and as 'no improvement' if the 2009 score was less than 1 SD higher (or stable or lower) than the 2007 score. As the range of the scale varied depending on the number of items included in that factor, the SD and thus the increase required to be classified as 'improved' varied across the factors. Improvement in health professional advice was defined as reporting 'no' in 2007 and 'yes' in 2009.

The demographic variables of age, country of birth, sex, marital status, level of education, income (Australian dollars) and having children under 18 years in the household were based on self-report. Height and weight were used to derive body mass index (BMI) in kg/m^2. Number of health conditions was based on a list of self-reported doctor diagnosed conditions including asthma, chronic bronchitis or emphysema, cancer, diabetes, heart/coronary disease, hypertension, osteoporosis, high cholesterol and other serious circulatory conditions (range 0–9). Self-rated health was assessed by asking "In general, would you say your health is excellent, very good, good, fair or poor?". Depressive feelings were assessed by asking "How often have you felt depressed during the last year?" (none/little/some vs. most/all of the time). Psychological distress was assessed using the Kessler 6 (K6) scale (range 6–30).[18]

Sociodemographic characteristics were compared between participants who did and who did not improve their PA from 2007 to 2009. Normally distributed variables are presented as means and standard deviations (SD), with differences tested using t-test. Skewed variables are presented as medians and interquartile ranges (IQR), with differences tested using the Mann–Whitney U test. Categorical variables are presented as percentages, with differences tested using the chi-squared test. First, associations between 2007 psychosocial factors and 2007–2009 improvement in PA were tested using binary logistic regression models. Second, associations between improvement in psychosocial factors and improvement in PA were tested using logistic regression models. Analyses were initially conducted unadjusted and then adjusted for those sociodemographic characteristics that were associated with the outcome as well as (the majority of) exposures. Results were based on two-sided tests and were considered statistically significant at a $p < 0.05$, except the regression models, which were considered statistically significant at a $p < 0.01$ to account for multiple testing. All analyses were done using STATA version 11.1 (StataCorp LP, TX).

3. Results

Of the 692 participants in the study sample, 296 (42.8%) increased their PA levels from 2007 to 2009. Those who increased PA were on average 55.6 (SD 6.6) years old and 71.7% were female, while those who did not increase PA were on average 55.1 (SD 6.7) years old and 67.2% were female. BMI was slightly lower in those