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## A randomized trial of a motivational interviewing intervention to increase lifestyle physical activity and improve self-reported function in adults with arthritis

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## ABSTRACT

**Background:** Arthritis is a leading cause of chronic pain and functional limitations. Exercise is beneficial for improving strength and function and decreasing pain. We evaluated the effect of a motivational interviewing-based lifestyle physical activity intervention on self-reported physical function in adults with knee osteoarthritis (KOA) or rheumatoid arthritis (RA).

**Methods:** Participants were randomized to intervention or control. Control participants received a brief physician recommendation to increase physical activity to meet national guidelines. Intervention participants received the same brief baseline physician recommendation in addition to motivational interviewing sessions at baseline, 3, 6, and 12 months. These sessions focused on facilitating individualized lifestyle physical activity goal setting. The primary outcome was change in self-reported physical function. Secondary outcomes were self-reported pain and accelerometer-measured physical activity. Self-reported KOA outcomes were evaluated by the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) for KOA (WOMAC scores range from 0 to 68 for function and 0 to 20 for pain) and the Health Assessment Questionnaire (HAQ) for RA. Outcomes were measured at baseline, 3, 6, 12, and 24 months. Multiple regression accounting for repeated measures was used to evaluate the overall intervention effect on outcomes controlling for baseline values.

**Results:** Participants included 155 adults with KOA (76 intervention and 79 control) and 185 adults with RA (93 intervention and 92 control). Among KOA participants, WOMAC physical function improvement was greater in the intervention group compared to the control group [difference = 2.21 (95% CI: 0.01, 4.41)]. WOMAC pain improvement was greater in the intervention group compared to the control group [difference = 0.70 (95% CI: -0.004, 1.41)]. There were no significant changes in physical activity. Among RA participants, no significant intervention effects were found.

**Conclusion:** Participants with KOA receiving the lifestyle intervention experienced modest improvement in self-reported function and a trend toward improved pain compared to controls. There was no intervention effect for RA participants. Further refinement of this intervention is needed for more robust improvement in function, pain, and physical activity.

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### Statement of clinical significance

Chronic arthritis is a leading cause of chronic pain and functional limitations. Clinical trials evaluating structured exercise programs in adults with knee osteoarthritis and rheumatoid arthritis demonstrate exercise is beneficial for improving strength

and function and decreasing pain. Whether lifestyle physical activity interventions can lead to improved outcomes in these populations is unknown. We demonstrated that a motivational interviewing-based intervention to increase lifestyle physical activity led to a statistically significant improvement in self-reported function and a nonstatistically significant trend toward improved pain but no improvement in physical activity in participants with knee osteoarthritis. Motivational interviewing interventions focusing on lifestyle physical activity show promise in helping adults with knee osteoarthritis experience improved physical function and less pain. Further study is needed to refine this evaluated intervention before disseminating it more broadly.

## Introduction

Chronic arthritis is a leading cause of chronic pain and functional limitations [1]. Of the more than 54 million Americans with arthritis, over 40% report arthritis-attributable activity limitation [1]. The most common joint diseases are knee osteoarthritis (KOA) and rheumatoid arthritis (RA) [2,3]. Despite many health benefits from physical activity, insufficient physical activity is endemic in adults with KOA and RA [4,5]. Observational studies have shown that individuals with KOA who increase physical activity have improved functional status and less disability [6]. Clinical trials evaluating exercise programs in adults with KOA and RA demonstrate exercise is beneficial for improving strength and function and decreasing pain; however, these studies focused on structured exercise interventions including walking programs, exercise classes, and physical therapy, which are difficult for many patients to initiate and sustain [7–11].

Two potential approaches to foster sustainable increases in physical activity are (1) to focus on lifestyle physical activity rather than structured exercise as a means to improve health and (2) to incorporate motivational interviewing techniques into the intervention to foster a more durable behavior change. Lifestyle physical activity is defined as the daily accumulation of activities including leisure, occupational, and household activities that are part of everyday life; this is in contrast to exercise which is often structured, purposeful, and performed in bouts lasting at least 10 minutes [12]. Studies comparing lifestyle physical activity interventions to structured exercise have demonstrated more sustained changes for lifestyle physical activity following the end of an intervention [13,14]. Engaging in lifestyle physical activity behavior, rather than structured exercise programs, might be more attainable throughout the intervention and more sustainable after the end of the intervention.

Motivational interviewing involves an interviewer eliciting personal motivation for change and identifying ambivalence and obstacles, followed by helping the participant create an individualized plan for change. Motivational interviewing has demonstrated effectiveness in helping individuals modify behaviors related to alcohol, drugs, and diet [15,16]. It has also helped individuals with chronic disease increase physical activity [17].

The Improving Motivation for Physical Activity in Arthritis Clinical Trial (IMPAACT) examined the hypotheses that a motivational interviewing-based intervention promoting lifestyle physical activity added to brief physician counseling would improve self-reported physical function (primary outcome) over 24 months in individuals with KOA and RA compared to a control group receiving only the brief physician counseling. Secondary outcomes were self-reported pain and increased objectively measured physical activity levels.

## Methods

### Study population

Participants with KOA were recruited from two faculty rheumatology practices, general medicine practices, and orthopedic surgery practices at a single academic medical center, as well as research registries and by advertisements placed in public transportation. KOA participants were required to have symptoms (knee pain, aching, or stiffness) on most days in the last month and to have radiographic KOA defined by Kellgren–Lawrence Class 2 or higher [18]. A screening procedure was created to determine eligibility of those responding to advertisements consisting of medical record review, phone interview, and knee x-rays if none were available from the prior 6 months. Patients with RA were recruited from the same two faculty rheumatology practices. RA participants fulfilled the 1988 ACR criteria for RA [19].

All participants also met the following additional criteria: (1) age 18 or greater, (2) no comorbidities that would limit potential functional improvement through physical activity (e.g., residual deficits from a stroke), (3) able to ambulate at least 50 ft, (4) body mass index (BMI) < 35 kg/m<sup>2</sup>, (5) no evidence of cognitive impairment or inability to speak and understand English, (6) no medical contraindications to physical activity (e.g., recent myocardial infarction or unstable angina), (7) no primary diagnosis of fibromyalgia, (8) no total joint replacement surgery within the past 12 months and no plans for total joint replacement in the next 24 months, and (9) no plans to relocate from the metropolitan area in the next 24 months.

The IMPAACT trial received approval from the Institutional Review Board and all participants provided written informed consent. This study was registered with [clinicaltrials.gov](http://clinicaltrials.gov) NCT00248105. Enrollment occurred from May 2006 until January 2010 and follow-up assessments ended in September 2010 due to funding constraints. Further details of the study design and procedures have been published by Chang et al. [20].

### Study procedures

Participants attended an initial visit at a centralized treatment site for baseline assessment followed by randomization. Participants were randomized 1:1 to 1 of 2 conditions: (1) IMPAACT intervention consisting of brief physician counseling and motivational interviewing intervention or (2) brief physician counseling only. KOA and RA subjects had separate randomization schemes. A senior statistician provided a computer-generated list of random numbers for allocation of participants. Block randomization was stratified by diagnosis (KOA vs. RA), site of recruitment (each practice site, registry recruitment, and community recruitment), and self-reported functional status (high vs. low). KOA participants were classified as high function if their baseline Western Ontario and McMaster Universities Osteoarthritis Index Physical Function Scale (WOMAC function) was greater than 20, the median of participants enrolled in the Mechanical Factors in Arthritis of the Knee (MAK) study conducted at our institution [21]. RA participants were classified as high functional status if their baseline Health Assessment Questionnaire–Disability Index (HAQ function) was greater than 0, the median of subjects enrolled in a study on RA remission conducted at our institution [22]. The randomization scheme was only available to the primary statistician. The research assistant communicated the stratification data to the statistician (diagnosis, recruitment site, and self-reported functional status) who then provided the research assistant with an envelope including the treatment group for the participant.

All participants were scheduled for the Index Physician Visit at which time scripted physician physical activity counseling

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