Intervention

The role of helplessness, outcome expectation for exercise and literacy in predicting disability and symptoms in older adults with arthritis

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ABSTRACT

Objective: To examine the effect of outcome expectation for exercise (OEE), helplessness, and literacy on arthritis outcomes in 2 community-based lifestyle randomized controlled trials (RCTs) conducted in urban and rural communities with older adults with arthritis.
Methods: Data from 391 participants in 2 RCTs were combined to examine associations of 2 psychosocial variables: helplessness and OEE, and literacy with arthritis outcomes. Arthritis outcomes namely, the Health Assessment Questionnaire-Disability Index (HAQ-DI) and arthritis symptoms pain, fatigue and stiffness Visual Analogue Scales (VAS), were measured at baseline and at the end of the interventions. Complete baseline and post-intervention data were analyzed using STATA version 9.
Results: Disability after intervention was not predicted by helplessness, literacy, or OEE in the adjusted model. Arthritis symptoms after the intervention were all significantly predicted by helplessness at various magnitudes in adjusted models, but OEE and literacy were not significant predictors.
Conclusion: When literacy, helplessness, and OEE were examined as predictors of arthritis outcomes in intervention trials, they did not predict disability. However, helplessness predicted symptoms of pain, fatigue, and stiffness, but literacy did not predict symptoms.
Practice implications: Future sustainable interventions may include self-management components that address decreasing helplessness to improve arthritis outcomes.

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1. Introduction

Arthritis, the nation's most common cause of disability, comprises more than 100 different types of rheumatic diseases and conditions including osteoarthritis (OA), rheumatoid arthritis (RA), systemic lupus erythematosus (SLE), fibromyalgia and gout. Arthritis causes pain, stiffness, swelling and loss of function in joints. Arthritis makes it more difficult to be physically active and not being physically active is a risk factor for many common chronic diseases. Further, more than half of adults with diabetes or heart disease also have arthritis. Hence people with arthritis need help to overcome arthritis-specific barriers so as to improve physical activity [1].

Studies of arthritis patients and those with other types of chronic pain support the central role of helplessness as a predictor for level of pain, disability, and depression over time [2–7]. Helplessness refers to an attributional style, explaining negative events and their consequences as uncontrollable, unpredictable, and unchangeable [2,8]. Higher helplessness scores and lower levels of formal education have been shown to be associated with increased mortality in RA [9].

Further, researchers in rheumatology have focused on assessments of health-related materials as well as the mismatch between the print materials and the reading skills of arthritis patients [10], though sparsely on the relationship between literacy and health outcomes and we know that individuals with low literacy have several adverse health outcomes [11]. In this body of research, literacy is measured by tests that assess the ability to read and comprehend health-related materials. These tests are highly correlated with general reading tests [11].

Social cognitive theory is useful for understanding health behavior because it combines two ideas: cognitive processes, which are central to behavior change, and performance-based procedures, which are powerful factors in changing behavior [12]. Most of the research using Bandura's social cognitive model has emphasized cognitive internal factors, such as outcome expectations. Outcome expectations are beliefs that benefits will follow particular behaviors [13]. The ultimate choices that people make about performing specific behaviors are strongly determined by beliefs about the probable consequences of performing that

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behavior (outcome expectation) [14]. Hence, outcome expectations influence behavior by serving as incentives (positive outcomes) or disincentives (negative outcomes) [12,14,15].

In older adults, outcome expectations are crucial to motivating exercise behavior. If older adults do not believe exercise will improve their health or function, it is unlikely that regular exercise will be practiced [16]. The literature has shown a consistently positive relationship between outcome expectations and related behavior [17,18]. Although, outcome expectations have received less attention in the literature, there is strong support for the relationship between outcome expectations and physical activity [19–21]. Also we know that arthritis interventions help people with arthritis and other rheumatic conditions to maximize their abilities and reduce pain and other arthritis-related problems [22].

Hence, our specific aim was to examine the effect of psychosocial variables (OEE and helplessness) and literacy on disability, pain, fatigue and stiffness in older adults with different types of self-reported arthritis (RA, OA, SLE, etc.) who participated in 2 community-based lifestyle randomized controlled trials (RCTs) conducted in urban and rural communities, People with Arthritis Can Exercise (PACE) (an 8-week exercise program) and Active Living Every Day (ALED) (a 20-week physical activity behavioral modification intervention). The hypothesis underlying this specific aim was that literacy and OEE will have higher positive associations with arthritis outcomes in the intervention group than the control group, while helplessness will have less negative associations with arthritis outcomes in the intervention than the control group.

2. Methods

This study was approved by University of North Carolina's Medical Institutional Review Board. Secondary analysis of two completed randomized controlled trials (RCTs) of physical activity life style interventions was conducted. These two RCT's, conducted by Callahan and colleagues, were designed to improve health outcomes for sedentary adults with arthritis. People with Arthritis Can Exercise (PACE) evaluated an 8-week exercise and education program, and Active Living Every Day (ALED) evaluated a 20-week physical activity behavioral modification intervention. The PACE intervention group participants met twice a week, resulting in 16 sessions of an hour each, while the ALED intervention group participants met once a week, resulting in 20 hourly sessions. The PACE and ALED control groups waited for 8 and 20 weeks, respectively, and were offered a delayed intervention after their assessments; so as to obtain benefits from the intervention. Although there are some differences in research design and measures, the studies had similar goals to evaluate the effectiveness of physical activity lifestyle interventions in changing arthritis-related health outcomes of potential importance. Further, the studies were sufficiently similar to allow us to combine the two data sets (Table 1). Continuous variables for the two studies PACE and ALED were compared by t tests, and the categorical variables were compared by chi square tests. Except for pain and fatigue, all other variables were not significantly different by study group (Table 1). The comparison before and after sample attrition was not different by study group; hence the baseline characteristics of the two groups after sample attrition have been shown in Table 1. In PACE and ALED, both groups completed the first assessment at baseline and the 2nd assessment at the completion of the intervention which included in both studies' self-report questionnaires. Only the intervention group completed the self-report questionnaires at the follow up assessment at 6 months. There were no differences between intervention and control groups for both studies in terms of demographic characteristics. A manuscript examining the primary trial results of PACE is published [23], while

that of ALED is in preparation. Detailed descriptions of PACE and ALED have been published [23–25].

2.1. Research participants

Sedentary adults were recruited from family practice offices, community centers, senior centers, health departments, health-care systems, fitness centers, and advertisements in local news-papers in 18 (PACE) and 17 (ALED) urban and rural areas across North Carolina. In both PACE and ALED ($N = 700$), participants were eligible if they (1) reported moderate to severe limitation in joint motion and/or strength resulting from arthritis or joint pain; (2) were currently exercising fewer than 3 times a week for less than 20 min; and (3) were mentally competent. No tests for detecting poor vision or cognitive impairment were performed. However, research assistants assessed whether participants had sufficient mental status to complete the questionnaires as they did the baseline assessments. No participants were deemed mentally incompetent in either RCT.

2.2. Intervention

PACE evaluated the effectiveness of an 8-week exercise and education program and ALED studied a 20-week behavioral lifestyle intervention. Both studies used similar approaches to encouraging behavioral change. Neither intervention was exclusively designed for low literacy participants.

Details of the PACE intervention trial have been described elsewhere [23]. The ALED program was developed jointly by the

Table 1
PACE versus ALED—baseline characteristics (after sample attrition).

	PACE	ALED
REALM	61.3	62.7
REALM < 9th grade	43 (22.5%)	30 (15%)
REALM ≥ 9th grade	148 (77.5%)	170 (85%)
Age (years)	69.6	68.0
Female	172 (90.1%)	168 (84%)
Male	19 (19.9%)	32 (16%)
Caucasian	151 (79.1%)	159 (79.5%)
African American	34 (17.8%)	35 (17.5%)
Others	6 (3.1%)	6 (3%)
Less than high school	22 (11.5%)	15 (7.5%)
High school	53 (27.7%)	55 (27.5%)
Some college	66 (34.6%)	70 (35%)
College degree	50 (26.2%)	60 (30%)
Retired	104 (54.5%)	103 (51.5%)
Working	19 (9.9%)	27 (13.5%)
Homemaker	23 (12%)	24 (12%)
Disabled	38 (19.9%)	38 (19%)
Other	7 (3.7%)	8 (4%)
Married	95 (49.7%)	117 (58.5%)
Separated/divorced	21 (11%)	15 (7.5%)
Widowed	60 (31.4%)	60 (30%)
Single	15 (7.9%)	8 (4%)
BMI	28.6	29.9
Co-morbidity	1.6	1.6
Intervention group	92 (48.2%)	104 (52%)
HAQ	1.1	0.95
Pain*	48.8	42.8
Fatigue*	46.9	39.6
Stiffness	43.6	45.9
Helplessness	2.4	2.5
Outcome expectation for exercise	4.0	4.0

REALM, Rapid Estimate of Adult Literacy in Medicine; BMI, body mass index; HAQ, Health Assessment Questionnaire.
* $p < 0.05$. There are 391 observations.