Pain Disability Among Older Adults With Arthritis

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Objective: The principal objective was to examine pain disability (the degree to which chronic pain interferes with daily activities) among older adults with arthritis. Specifically, answers to two research questions were sought: (a) Does psychological distress reliably predict pain disability; and (b) do certain theoretically important host, sociodemographic, and health-related factors reliably predict pain disability? **Method:** Descriptive, univariate, and multivariate regression analyses were employed to assess key psychosocial, disease, and host factors among the sample (N = 141) of adults with arthritis, aged ≥ 50 years old. **Results:** The resultant regression model accounted for 63.7% (60.0% adjusted) of the variance and was significant at $p < .01$. Psychological distress, overall health, disease activity, and disease self-efficacy were found to predict pain disability. **Discussion:** Sample members with greater pain disability experienced heightened psychological distress, poorer perceptions of their overall health, more surgeries, higher unemployment, more intense disease activity, longer disease duration, and lower disease self-efficacy.

Keywords: *arthritis; osteoarthritis; rheumatoid arthritis; pain disability; disease activity*

Unfortunately, of the approximate 49 million adults with self-reported arthritis or chronic joint symptoms (Centers for Disease Control and Prevention, 2002), as many as 10.3 million (21.7% of all adults) will not seek medical attention for the pain associated with

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their arthritis or chronic joint symptoms (Centers for Disease Control and Prevention, 2003). However, the remaining 37.3 million will pursue some form of relief and will experience varying degrees of remediation by means of a number of eclectic pharmacological and complementary and alternative approaches. Frequently prescribed medications include acetaminophen, nonsteroidal anti-inflammatory drugs (NSAIDs), opioids, and nonopioids agents (e.g., tricyclic antidepressants, anticonvulsants, steroids, etc.; Freedman, 2002). Often, a simple oral analgesic such as acetaminophen is used to reduce initial pain; however, if pain relief is inadequate, oral NSAIDs or intra-articular injections of hyaluronic acidlike products may be given. Additionally, for certain symptom episodes, intra-articular corticosteroid injections may provide short-term pain relief (Manek & Lane, 2000). Nonpharmacologic and complementary and alternative medicine strategies encompass patient education; weight loss; physical activity; bracing and corrective footwear; mineral and vitamin consumption; acupuncture; cognitive-behavioral therapies; and physical modalities as heat, cold, transcutaneous electrical nerve stimulation, low-energy laser, topical applications, and external devices (American Geriatrics Society, 1998; Ernst, 2003; Evers, Kraaimaat, van Riel, & de Jong, 2002; Fautrel et al., 2002; Kee, 2000; Perkins & Doherty, 1999). Despite the availability of such a diverse array of approaches to treatment, rheumatic-related pain disability remains as the second leading cause of disability, mobility limitation, and pain activity limitation in America (Daltroy & Liang, 1993).

The principal objective of the present study was to examine the degree to which chronic pain interferes with daily activities (pain disability) among older adults with arthritis who are under current treatment. Specifically, answers to two research questions were sought: (a)

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Does psychological distress reliably predict pain disability; and (b) do certain theoretically important host, sociodemographic, and health-related factors (e.g., disease history, arthritis medications, disease activity, disease duration, and patient disease self-efficacy) reliably predict pain disability?

Method

STUDY DESIGN, PARTICIPANTS, AND PROCEDURES

The research setting for the current cross-sectional study was an Outpatient Rheumatology Clinic located in the southeastern United States. After receiving approval from the Clinic's Institutional Review Board, self-reported instruments and a clinician's assessment form were used to gather information from the convenience sample of consenting rheumatoid arthritis (RA) or osteoarthritis (OA) patients. Inclusion criteria for the study were fourfold: a diagnosis by a board certified rheumatologist of RA or OA, a chronological age of at least 50 years, an ability to effectively communicate in English in both oral and written formats, and the absence of dementia or an uncontrolled, concurrent chronic disease (apart from arthritis).

The study's sample size (a minimum of 140 participants) was estimated using the cases per predictor variable ratio of 10 to 1 to achieve the adequate prediction of beta weights for the 13 predictor variables (Tabachnick & Fidell, 1996). Participants (N = 141) in this cross-sectional study ranged in age from 50 to 95 years (M = 65, SD = 9.6 years). Racial percentages for the convenience sample—White, non-Hispanic (64%) and Black, non-Hispanic (36%)—were consistent with the profile of county residents (United States Bureau of the Census, 1999), with rheumatology patients who attended an outpatient rheumatology clinic from May through July of 2001, but not with the disease properties for arthritis—White, non-Hispanic (35%) and Black, non-Hispanic (31.5%; Centers for Disease Control and Prevention, 2002). Furthermore, the gender mix of the convenience sample, women (84%) to men (16%), was not representative of the general arthritis population, women (59%) to men (41%; Centers for Disease Control and Prevention, 2002).

PROCEDURES

Measures

The Pain Disability Index (PDI; Pollard, 1984) and a modified Visual Analog Scale (VAS) provided important information regarding functional disability. The PDI, a self-report measure that appraises the degree to which chronic pain interferes with daily activities, was used to quantify self-reported pain disability and to calculate disability indices as they related to such life activities as family and home responsibilities, recreation, social activity, occupation, sexual behavior, self-care, and life support activity. Internal consistency of the PDI for this study was 0.91. A second assessment of functional disability was accomplished through use of the modified VAS, an instrument that measured the amount and length of time of morning stiffness and the number of inflamed, swollen, or painful joints. Intensity levels of disease activity were reflected numerically along a modified response scale with anchors of 0 = *no disease activity* and 100 = *the most disease activity ever.*

The Arthritis Impact Management Scale–2 (Meenan, Mason, Anderson, Guccione, & Kazis, 1992) was used to evaluate psychological distress. This instrument consists of 78 multidimensional items that evaluate health status, which is modeled as the aggregate of five components: physical (the average of mobility level, walking and bending, hand and finger function, arm function, self-care, and household tasks scores), affect (the average of level of tension and mood scores), symptom (arthritis pain scores), social interaction (the average of social activity and support from family scores), and role (work scores). Affect scores were used to reflect levels of psychological distress. The internal consistency for the subscales of the levels of tension and mood scales were 0.88 and 0.80, respectively, for the current study.

The Arthritis Self-Efficacy Scale (Lorig, Chastain, Ung, Shoor, & Holman, 1989) was used to investigate disease self-efficacy (the arthritis patients' perceptions of their ability to cope with the consequences of their disease). Participants were asked to rate the strength of their perceived ability to perform specific behaviors for controlling pain and disability. Individual responses were then translated into

appropriate scale values (0 to 100) and evaluated. The scale, developed specifically for the purpose of measuring arthritis patients' perceptions of their ability to cope with the consequences of their disease, consists of 18 questions that address patient perceptions regarding their ability to perform those tasks associated with daily activities. The internal consistency for each of the subscales was 0.93.

The host-factor data collected from completed demographics questionnaires and clinician's assessment forms provided detailed information about patient age, gender, marital status, race, educational level, income satisfaction, general health state, current rheumatologist, medications currently consumed, exercise history, and perceived disease activity. Data concerning the specifics of each paricipant's arthritis (i.e., type of disease, disease duration, name of rheumatologist, and number of surgeries) were recorded on the clinician's assessment form.

DATA ANALYSIS

Using a Windows PC version of SAS 8.0, descriptive statistics, bivariate associations, and univariate and multivariate regression analyses were performed on the dependent variable, pain disability, and 13 theoretically important potential independent predictors. No missing values among the chosen suite of variable arrays were observed. The poor splits on gender (118 to 23) and educational attainment (107 to 34) potentially truncated their respective correlations with other variables; however, they were still retained for analysis. Because linearity, skewness, and kurtosis estimates were within acceptable ranges, no variables were transformed. And, finally, no cases were determined to be either univariate or multivariate outliers.

A threefold approach was adopted to affect descriptive and inferential analyses of the collected data. Initially, descriptive data was cross-tabulated to reflect characteristic data for both higher and lower levels of pain disability. Next, 13 potential predictors (number of diseases, psychological distress, marital status, educational attainment, income satisfaction, perception of overall health, arthritis medications, type of arthritis, disease activity, disease duration, number of surgeries, and disease self-efficacy) were identified through Pearson correlation ($p \leq .05$) and goodness-of-fit tests. And, finally, these potential predic-

tors were evaluated for significance through multivariate regression analyses.

Results

SAMPLE CHARACTERISTICS

The typical participant was married (53%), White (non-Hispanic; 67%), graduated from high school (75%), and no longer working (76%). RA patients (55%) slightly outnumbered those with OA (45%). From among arthritis medications, NSAIDs were most often taken (53%). A majority reported that their income met their needs most or all of the time (64%) and that their overall health was neither excellent nor good (65%). Those with higher pain disability tended toward greater numbers of comorbid diseases (22.7%), higher levels of psychological distress (31.2%), less employment (40.4%), less satisfaction with income (23.4%), poorer overall health (39.0%), higher disease activity (35.5%), and less disease self-efficacy (11.3%). Characteristics of the sample are presented in Table 1. Measure scores are assessed with respect to pain disability in Table 2.

FACTORS PREDICTING PAIN DISABILITY

Univariate and multivariate regression identified four independently significant predictors of pain disability: psychological distress ($p = .05$), overall health ($p = .02$), disease activity ($p < .01$), and disease self-efficacy ($p = .05$). The regression model accounted for 63.7% (60.0% adjusted) of the variance and was significant at < .0011. The R for regression was significantly different from zero, $F(13, 127) = 17.151$, $p \leq .001$. Table 3 displays the univariate and multivariable regression coefficients, standard errors, and significance levels. Although univariate regression coefficients for pain disability and number of diseases, work status, income satisfaction, and disease duration were significant, they did not contribute significantly to the regression model. Post hoc evaluations of the correlations of the number of diseases, $F(13, 127) = 0.714$, $p = .05$; work status, $F(13, 127) = 0.288$, $p = .05$); income satisfaction, $F(13, 127) = 1.154$, $p = .05$; and disease duration, $F(13, 127) = 0.356$, $p = .05$, indicated they were not

Table 1
Characteristics of Survey Participants

Variable	*Pain Disability (Lower)*[a] n *(%)*	*Pain Disability (Higher)*[b] n *(%)*	c^2 *(*r*)*[c]
Gender (female)	62 (82.7)	56 (84.8)	.122 (.453)
Race (White)	54 (72.0)	41 (62.1)	1.559 (.143)
Age (≥ 65)	34 (45.3)	32 (48.5)	.140 (.419)
50 to 60	30 (40.0)	36 (39.4)	
61 to 70	25 (33.3)	22 (33.3)	
71+	20 (26.7)	18 (27.3)	
Married (yes)	44 (58.7)	31 (47.0)	1.929 (.111)
Residence (living with someone)	57 (76.0)	45 (68.2)	1.072 (.198)
Education (high school graduate)	56 (74.7)	52 (78.8)	.333 (.354)
Income (adequate)	56 (74.7)	33 (50.0)	9.176 (.002)[d]
Work (no)	50 (66.7)	57 (86.4)	7.443 (.005)[c]
Type of arthritis (RA)	42 (56.0)	35 (53.0)	.125 (.427)
Perceptions of health (fair or bad)	37 (49.3)	55 (83.3)	11.620 (.001)[c]
Arthritis-related surgeries (yes)	12 (16.0)	11 (16.7)	.011 (.547)
Comorbidity (higher)[d]	21 (28.0)	32 (48.5)	6.280 (.010)[c]
Cancer (yes)	4 (5.3)	6 (9.1)	.752 (.295)
Diabetes (yes)	10 (13.3)	12 (18.2)	.627 (.288)
Heart disease (yes)	12 (16.0)	14 (21.2)	.634 (.281)
High blood pressure (yes)	36 (48.0)	41 (62.1)	2.824 (.065)
Kidney disease (yes)	6 (8.0)	2 (3.0)	1.620 (.183)
Lung disease (yes)	4 (5.3)	7 (10.6)	1.357 (.198)
Liver disease (yes)	0 (0.0)	3 (4.5)	3.483 (.100)
Stomach disease (yes)	11 (14.7)	15 (22.7)	1.517 (.155)
Blood disease (yes)	7 (9.3)	6 (9.1)	.002 (.597)
Mental illness (yes)	2 (2.7)	5 (7.6)	1.793 (.171)
Arthritis medications (yes)	67 (89.3)	58 (87.9)	.074 (.496)
Antiosteoporotics (yes)	6 (8.0)	6 (9.1)	.054 (.526)
DMARDS (yes)	31 (41.3)	24 (36.4)	.364 (.334)
NSAIDS (yes)	38 (50.7)	36 (54.5)	.212 (.386)
Glucocorticoids (yes)	20 (26.7)	16 (24.2)	.109 (.447)
Narcotic analgesics (yes)	5 (6.7)	10 (15.2)	2.659 (.087)
Nonnarcotic analgesics (yes)	24 (32.0)	21 (31.8)	.001 (.563)
Glucosamine or Chondroitin (yes)	7 (9.3)	4 (6.1)	.523 (.334)
Other arthritis drugs (yes)	13 (17.3)	14 (21.2)	.341 (.355)

Note: RA = rheumatoid arthritis; DMARDS = disease-modifying antirheumatic drugs; NSAIDS = nonsteroidal anti-inflammatory drugs.

a. Pain disability (lower): $n = 75$. Lower pain disability scores are those < than the Pain Disability Index's (PDI) mean (< 27.91).

b. Pain disability (higher): $n = 66$. Higher pain disability scores are those ≥ the PDI's mean (≥ 27.91).

c. Significant at $p \leq .05$ for the one-tailed Fisher's exact test.

d. Higher comorbidity is defined as the reporting of RA and osteoarthritis plus two or more comorbid diseases.

Table 2
Pain Disability, Arthritis, and Health-Related Measures

Instrument	*Pain Disability Index (Lower)*[a] μ ± SD	*Pain Disability Index (Higher)*[b] μ ± SD	r[c]
Arthritis Self-Efficacy Scale	66.95 ± 19.97	41.25 ± 17.51	.001[d]
AIMS-2	30.94 ± 12.12	53.64 ± 14.19	.001[d]
AIMS-2 Physical subscale	1.74 ± 1.32	4.10 ± 1.64	.001[d]
AIMS-2 Affect subscale	3.35 ± 1.31	4.63 ± 1.50	.001[d]
AIMS-2 Social Interaction subscale	3.00 ± 1.35	3.61 ± 1.50	.096
Visual Analogue Scale	36.53 ± 24.85	68.33 ± 19.66	.001[d]

Note: μ ± *SD* = mean (μ) ± standard deviation (*SD*); AIMS-2 = Arthritis Impact Measurement Scale-2.
a. Pain disability index (PDI) (lower): $n = 75$. Lower PDI scores are those less than the Physical Disability Index's mean (μ ± *SD* = 27.91 ± 17.51).
b. PDI (higher): $n = 66$. Higher PDI scores are those ≥ the Physical Disability Index mean.
c. The *r* value for the one-tailed Fisher's exact test.
d. Significant at $p \leq .05$.

significantly different from zero. Apparently, the relationships between pain disability and the number of diseases, work status, income satisfaction, and disease duration were not mediated by the relationships between overall health, psychological distress, disease activity, and disease self-efficacy.

Discussion

The current study was guided by two research questions. The first concerned the relationship between pain disability and psychological distress. A significant correlation was noted between pain disability and psychological distress. A number of related studies have shown that higher levels of psychological distress are more prevalent among arthritis patients than in the general population (Huyser & Parker, 1999; Smedstad, Moum, Vaglum, & Kvien, 1996). Consistent with this finding, the current study's prevalence for heightened psychological distress was 66%, noticeably higher than the otherwise observed peak rate of 50% (Wright et al., 1998). Several factors may have contributed to this finding: the mean age of the older adults with arthritis

Table 3
Regression Analysis of Predictors of Pain Disability Among Older Adults With Arthritis ($\alpha = .05$)

	Univariate			*Multivariate*		
	β	SE	r	β[a]	SE	r
Number of diseases	9.31	2.95	< .01[b]	–0.31	0.90	0.73
Psychological distress	5.87	0.83	< .01[b]	1.53	0.78	0.05[b]
Marital status	–3.93	2.95	0.18	–1.16	2.10	0.58
Educational attainment	1.62	3.49	0.64	4.46	2.42	0.07
Work status	–11.74	3.13	< .01[b]	–4.45	2.49	0.08
Income satisfaction	11.72	2.90	< .01[b]	–1.16	2.31	0.62
Overall health	11.40	1.35	< .01[b]	–4.81	1.49	0.02^b
Arthritis medications	– 5.32	4.64	0.25	– 0.08	3.21	0.98
Type of arthritis	– 0.37	2.97	0.90	2.75	2.03	0.18
Disease activity	0.44	0.04	< .01[b]	0.27	0.05	< .01[b]
Disease duration	4.32	1.86	0.02[b]	1.89	1.27	0.14
Number of surgeries	4.53	3.99	0.56	0.88	0.98	0.37
Disease self–efficacy	–0.47	0.05	< .01[b]	–0.12	0.06	0.05[b]

a. $r^2 = .63.7$, adjusted $r^2 = .60.0$, $F(13, 127) = 17.15$, $p \leq .001$.
b. Significant at $p \leq .05$.

population, the presence of chronic disease, a poorer overall health state, the need for arthritis medications, and multiple socioeconomic status–related issues. Higher psychological distress among older adults with arthritis is frequently associated with greater pain disability (Affleck, Tennen, Urrows, & Higgins, 1991; Smedstad et al., 1996), dysfunctionality, poor health perception, aggravated symptoms, a worsening quality of life, and, in as many as 15% of patients, loss of life (Chou & Chi, 2002; Dickens & Creed, 2001; Dickens, McGowan, Clark-Carter, & Creed, 2002; el-Miedany & el-Rasheed, 2002; Yukioka et al., 2002). Furthermore, psychological distress affects both sexes and all ages and precipitates exorbitant costs associated with large numbers of hospitalizations, increased drug use, lost productivity, and consumption of limited resources (Berto, D'Ilario, Ruffo, Di Virgilio, & Rizzo, 2000). In spite of its high prevalence and adverse consequences among the older adults with arthritis population, psychological distress is only correctly diagnosed in fewer than 1 in 20 instances (Mourilhe & Stokes, 1998).

The second research question addressed potential correlations between pain disability and theoretically important host, sociodemographic, and health-related factors. Three were found to be sig-

nificant. The first, individual perception of overall health, significantly contributed to the regression model for pain disability. The importance of a positive perception of overall health to a sense of well-being for older adults with arthritis has been underscored in a number of studies. Several have probed the critical relationships that directly influence patients' perceptions of their health status related to perceived health status and mortality (Idler & Kasl, 1991; Wolinsky & Johnson, 1992), health protective behaviors (Lucas, Orshan, & Cook, 2000), and declining health (Rodin & McAvay, 1992). Others have observed that older adults who perceive their health to be poor have a much higher risk factor for dying than those who perceive themselves to be in excellent health. They are also less likely to participate in health protective behaviors (e.g., achieving proper nutrition, adequate sleep, smoking cessation, enjoyment obtained from hobbies or selected programmed activities, and positive interaction with other people) and generally experience declining health (Lucas et al., 2000). Similar results were found in the current study. Those older adults, along with arthritis participants who indicated poorer perceptions of their health, reported larger numbers of surgeries, higher psychological distress, limited education, unemployment, less satisfaction with their incomes, more intense disease activity, longer disease duration, and lower disease self-efficacy. In contrast, those with reciprocal scores were more likely to make contributions to health-promoting behaviors.

Disease activity was found to be another independent predictor of pain disability. Older adults with arthritis in the current study with nonremissive disease activity experienced poorer health outcomes and reported larger pathologic load, higher psychological distress, greater unemployment, less satisfaction with income, poorer self-perception of overall health, more pain disability, and lower disease efficacy. Although participants in this study reported that they were not confident that the arthritis medications would alleviate their pain, it is known that early aggressive or disease-specific treatment often ameliorates disease activity and retards radiographic progression in the long term (Albers et al., 2001). Multiple cross-sectional and longitudinal studies have also documented the links between disease activity, psychological distress, and pain disability (J. Parker et al., 1992). Increased disease activity has been associated with more clinic visits,

more tiredness, higher anxiety scores, more pain (Scharloo et al., 1999), larger quadriceps sensorimotor deficits (Bearne, Scott, & Hurley, 2002), higher mortality (Chehata et al., 2001), a lack of dynamic strength training (Hakkinen, Sokka, Kotaniemi, & Hannonen, 2001), functional disability (Molenaar, Voskuyl, & Dijkmans, 2002), interpersonal stress (Smith & Zautra, 2002), and helplessness and depression (J. C. Parker et al., 1991).

Beyond psychological distress, perception of overall health, and disease activity, self-efficacy regarding the management of arthritis symptoms was found to be another reliable predictor. Disease self-efficacy was observed to be inversely related to pain disability and psychological distress; the stronger the perception that pain can be self-managed, the lower the levels of psychological distress. Moreover, less disease self-efficacy resulted in larger pathologic load, greater psychological distress, disease activity and pain disability, less employment and satisfaction with income, poorer perception of health state, and longer disease duration among the study's cohort. Such observations are consistent with those studies that suggest that disease self-efficacy predicts pain and other dimensions of health status in proportion to the degree individuals believe that relevant behaviors will lead to improved health status (Bradley, 1994). Disease self-efficacy beliefs critically influence the effects of treatment programs, especially at the point of pain disability (Rejeski, Ettinger, Martin, & Morgan, 1998). Associations between higher levels of disease self-efficacy and improvements in pain and disease activity have been variously documented among arthritis patients (Lefebvre et al., 1999; Smarr et al., 1997). However, the maintenance of higher levels of disease self-efficacy has been particularly difficult for older adults with arthritis because with the aging process and the progression of arthritis, there is the increasing potential for (and, in some cases, the actuality of) the loss of personal control. With the loss of control and higher levels of helplessness, the ability of older arthritis patients to handle immediate difficulties is diminished, especially in the face of commensurate increases in pain disability. With lower levels of disease self-efficacy and increased levels of pain, there are corresponding increases in the number of requests for health services, including more visits to physicians, more laboratory tests, and longer hospital

stays (Mazzuca, Brandt, Katz, Hanna, & Melfi, 1999) and a growing inability to ignore pain sensations and to avoid catastrophizing (Keefe et al., 1997; Riemsma et al., 1998).

It should be noted that certain limitations at the point of generalizability of this study's findings exist. These limitations are the consequence of, in part, a comparatively small and completely volunteer, incentivized convenience sample ($N = 141$) concentrated in a single geographical area and less than desired gender and ethnic mixes.

In summary, psychological distress, disease activity, perceptions of overall health, and disease self-efficacy were observed to be significant independent predictors in explaining pain disability. Sample members with greater pain disability experienced heightened psychological distress, poorer perceptions of health, larger numbers of surgeries, higher unemployment, more intense disease activity, longer disease duration, and lower disease self-efficacy.

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