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ORIGINAL ARTICLE

Positive Affect and Disability Among Older Mexican Americans With Arthritis

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Objective. **To examine the relationship between positive affect and subsequent functional disability in older Mexican Americans with self-reported physician-diagnosed arthritis.**

Methods. **We conducted a 2-year prospective cohort study using a population-based sample of 1,084 noninstitutionalized Mexican American subjects aged ≥65 years residing in 5 southwestern states. Measures included self-reported diagnoses of various medical conditions, functional ability, body mass index, and ratings of positive and negative affect.**

Results. **For 937 subjects with arthritis who reported no limitations in activities of daily living (ADLs) at baseline, 697 remained ADL independent, 84 became ADL dependent, 41 died, and 115 were lost to followup 2 years later. There was a significant association between high positive affect (score = 12) and reduced risk of ADL disability 2 years later, controlling for baseline sociodemographic variables, medical conditions, and negative affect (odds ratio 0.46, 95% confidence interval 0.22–0.94). There was an interaction effect between positive affect and sex, with positive affect having a larger effect in reducing risk of ADL dependence in men than in women.**

Conclusion. **High positive affect was associated with lower incidence of ADL disability in older Mexican Americans with self-reported physician-diagnosed arthritis. The strength of the positive affect is stronger in men than in women.**

KEY WORDS. Aging; ADL; Arthritis; Positive affect; Disability; Mexican Americans.

INTRODUCTION

Arthritis is the most commonly reported chronic condition and the leading cause of disability among older adults in the United States (1,2). The prevalence of arthritis is ~5% for the adult population and increases to ~50% for those aged ≥65 years (1,3). Women have a higher prevalence of arthritis than men (2,4,5). The prevalence is similar for non-Hispanic whites and African Americans, and somewhat lower for Asians and Hispanics (3,6).

Arthritis can lead to immobility and physical inactivity, which in turn are risk factors for disability and mortality (2,7,8). Studies have shown that disability is one of the most significant predictors of poor health-related outcomes in older persons (9–11). Older adults with disability also have a higher risk for depression and institutionalization (9,10,12). The annual direct cost associated with arthritis is nearly 65 billion dollars (13). The estimated annual costs for caring for disabled older adults is 80 billion dollars in the United States (14).

Several recent studies have suggested that positive affect may reduce functional decline in older adults (15–17). Positive affect entails a sense of emotional well-being and an optimistic attitude toward life (15). High positive affect reflects an individual's emotional relationship with his or her environment, communicating qualities such as happiness, personal satisfaction, optimism, and morale (18,19). The measurements of positive affect and negative affect have been shown to be relatively independent of each other, and the 2 measures correlate with different personal characteristics (20). Persons in a positive mood are likely to engage in social relationships (21), to be optimistic about their future (22), to cope successfully with stressful situations (23), and to feel in control of their lives (23).

Among older adults, it has been shown that the presence of depressive symptoms is associated with functional decline, increased cognitive impairment, increased health care service utilization, and poorer outcomes (24–26). Depression and its side effects have been studied extensively, but there has been limited research on positive affect and its consequences. Emerging studies have found that increasing positive affect decreases the risk of stroke, coronary heart disease, disability, and functional decline (15,17,27,28). Because arthritis is a major predictor of sub-

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sequent functional decline, we were interested in whether a positive affect reduces the risk of functional decline in older adults with arthritis. In this study, we used data from the Hispanic Established Population for the Epidemiological Study of the Elderly (EPESE) to examine the relationship between positive affect and subsequent functional disability in older Mexican Americans with self-reported physician-diagnosed arthritis. We hypothesize that high positive affect would be associated with less incident disability in older Mexican Americans with self-reported physician-diagnosed arthritis.

SUBJECTS AND METHODS

Sample. Data are from the EPESE, a longitudinal study of Mexican Americans aged 65 and older. The Hispanic EPESE was modeled after previous Established Populations for the Epidemiological Study of the Elderly studies conducted in New Haven, East Boston, rural Iowa, and North Carolina (29).

In the EPESE, subjects were selected from 5 southwestern states (Texas, California, Arizona, Colorado, and New Mexico) using area probability sampling procedures. In the first stage, counties were selected if at least 6.6% of the county population was of Mexican American ethnicity. The second stage involved the selection of 300 randomly chosen census tracts. The third stage involved the selection of 3 randomly selected blocks. For the third stage, 1 or 2 additional blocks were added to obtain at least 400 households within each sampling unit. The fourth stage involved in-home assessments (up to 4 interviews per household) on sociodemographic characteristics, psychosocial factors, and objective and subjective health factors. The sampling procedure assures a sample that is generalizable to ~500,000 older Mexican Americans living in the southwest (30,31). The response rate at baseline was 83%. In-home interviews were conducted in Spanish or English depending on the respondent's preference.

At the baseline interview, 2,873 subjects were interviewed in person and 177 (5.8%) by proxy. At the 2-year followup interview (1995–1996), 2,167 subjects were reinterviewed in person and 272 (8.9%) by proxy. The analysis reported below is based on 1,084 subjects with self-reported physician-diagnosed arthritis who completed the followup.

Arthritis. A prior physician diagnosis of arthritis was assessed with the following question: "Have you ever been told by a doctor that you have arthritis or rheumatism?" Similar questions were used in the first and second National Health and Nutrition Examination Surveys (32). Responses were coded as "Yes" or "No."

Positive and negative affect. A 4-item positive affect scale was formulated from the Center for Epidemiologic Studies Depression Scale (CES-D) (33). We had previously identified 4 items that load into a single positive affect factor (34); this result was also reported by Sheehan et al (35). The 4-item positive scale is presented in Table 1. The responses were scored on a 4-point scale from 0 to 3. A score of 0 corresponded to a response of rarely or none of the time, a score of 1 corresponded to some or a little of the time, a score of 2 corresponded to occasionally or a moderate amount of time, and a score of 3 corresponded to most or all the time. Scores were divided into approximate quartiles (0–6, 7–9, 10–11, and 12) with higher scores indicating increased positive affect. The 4-item positive affect scale showed high internal consistency ($\alpha = 0.76$).

Table 1. Descriptions of positive affect scale, negative affect scale, and activities of daily living index

Positive affect scale
"I felt that I was just as good as other people"
"I felt hopeful about the future"
"I was happy"
"I enjoyed life"
Negative affect scale
"I felt that I could not shake off the blues even with help from my family and friends"
"I felt depressed"
"I thought my life had been a failure"
"I felt fearful"
"I felt lonely"
"I had crying spells"
"I felt sad"
Activities of daily living index
Walking across a small room
Bathing
Grooming
Dressing
Eating
Transferring from a bed to a chair
Using the toilet

Factor analysis by Krause and Markides (36) identified a 7-item negative affect scale from the CES-D (Table 1). The responses were scored on a 4-point scale (0–3, ranging from rarely or none of the time to most or all of the time) with potential total scores ranging from 0 to 21. Of the subjects, 25% scored 0 on the negative affect scale and were given a value of 0; 75% scored ≥1 and were given a value of 1. The internal consistency of the 7-item scale is high ($\alpha = 0.91$). The 4-item positive scale was weakly correlated with the 7-item negative affect scale ($\alpha = -0.32$).

Functional disability. Functional disability was assessed by self report with a modified version of Katz's Activities of Daily Living (ADL) scale. The scale includes 5 items from the original Katz ADL scale (37) and 2 items developed by Branch et al (38). The modified ADL scale is one of the most commonly used measures assessing physical functioning in community-dwelling populations (37,38). The 7 items of the ADL index are presented in Table 1. Respondents were asked to indicate if they could perform the activity without help, with help, or if they were unable to do it. Disability was dichotomized as no help needed versus needing help with or unable to perform 1 or more of the 7 ADLs.

Table 2. Baseline characteristics of the sample (n = 1,084)*

Independent variables	No.	Value
Age, years, mean ± SD	1,084	72.8 ± 6.3
Sex, female, %	766	70.7
Marital status, married, %	562	51.9
Education, years, %		
≥8	265	24.5
<8	819	75.5
Number of medical condition, Mean ± SD	1,084	1.1 ± 0.9
BMI ≥30 kg/m^2, %	388	35.8
Positive affect score, possible range 0–12, mean ± SD	1,084	8.4 ± 3.4
Positive affect score, %		
0–6	278	25.7
7–9	356	32.8
10–11	169	15.6
12	281	25.9
Negative affect score, possible range 0–21, mean ± SD	1,084	3.9 ± 4.6
Negative affect score, %		
0	882	76.8
≥1	252	23.2
Any ADL limitation, %	1,084	13.6

* BMI = body mass index; ADL = activity of daily living.

Covariates. Baseline sociodemographic variables included age, sex, marital status (married versus unmarried), and education (<8 years versus ≥8 years). A summary medical conditions variable was created at baseline. The summary measure included diabetes, heart attack, stroke, hypertension, cancer, and hip fracture (range 0–6). The body mass index (BMI) was computed as weight in kilograms divided by height in meters squared. Anthropometric measurements were collected in the home using the methods and instructions similar to those employed in other EPESE studies. Height was measured using a tape placed against the wall and weight using a Metro 9800 measuring scale (Scale People, Beltsville, MD). Subjects with a BMI ≥ 30 were categorized as obese (39).

Outcome. Incidence of disability was defined as a new onset of any ADL limitation (needing help with or unable to perform 1 or more of the 7 ADLs) at the 2-year followup.

Statistical analysis. Cronbach's coefficient alpha assessed the internal consistency of the 4-item positive affect scale and the 7-item negative affect scale. Correlation coefficient was used to test the association between the positive and negative affect scales. Univariate analysis estimated the unadjusted odds of any ADL limitation at the 2-year followup interview for nondisabled subjects at baseline. Multivariate analysis estimated the odds of any ADL limitation at the 2-year followup for nondisabled subjects at baseline as a function of positive affect, controlling for demographic characteristics (age, sex, marital status, and education), medical conditions, negative affect, and BMI. Interaction effects were performed between positive affect and age, sex, education, marital status, medical conditions, and obesity. All analyses were performed using the SAS System for Windows, version 8 (SAS Institute, Cary, NC).

RESULTS

Of the 3,050 noninstitutionalized older Mexican Americans interviewed at baseline, 1,084 had been told they had arthritis by a physician. Table 2 presents baseline characteristics of this sample. The average age was 72.8 years and 70.7% of respondents were female. More than half of the sample was currently married and 75.5% had <8 years of formal education. The average number of medical conditions was 1.1 (SD 0.9), 36.7% had a BMI ≥ 30 kg/m^2, and 13.6% reported at least 1 ADL limitation. The mean positive affect and negative affect scores were 8.4 (SD 3.4) and 3.9 (SD 4.6), respectively.

Of the 937 subjects who reported no activities of daily living (ADL) limitation at baseline, 697 (74.4 %) remained ADL independent 2 years later, 84 (8.9 %) became ADL dependent, 115 (12.3 %) refused to be reinterviewed or were lost to followup, and 41 (4.4 %) were confirmed dead through Epidemiology Resources Incorporated using the Social Security Administration's Death Master Files and reports from relatives.

Table 3 presents results of a univariate analysis predicting odds of any ADL limitation at followup among subjects who were not disabled at baseline. Subjects in the highest positive affect quartile (odds ratio [OR] 0.97, 95% confidence interval [95% CI] 0.25–0.95) and married (OR 0.63, 95% CI 0.40–0.99) were significantly less likely to report ADL limitations 2 years later. Older age (OR 1.11, 95% CI 1.07–1.15) and number of medical conditions (OR 1.52, 95% CI 1.20–1.93) increased the odds of reporting ADL limitations 2 years later.

Table 3. Univariate analysis predicting odds of any ADL limitation at followup among nondisabled older Mexican Americans with arthritis*

Independent variables	OR (95% CI) n = 781
Positive affect score (0–6)	
7–9	0.97 (0.56–1.70)
10–11	0.57 (0.26–1.24)
12	0.49 (0.25–0.95)
Negative affect score (≥1)	0.94 (0.54–1.65)
Age (1 year increase)	1.11 (1.07–1.15)
Sex (female)	1.59 (0.92–2.75)
Marital status (married)	0.63 (0.40–0.99)
Education (≥8 years)	0.69 (0.38–1.23)
Number of medical conditions	1.52 (1.20–1.93)
BMI (≥30 kg/m^2)	1.00 (0.63–1.60)

* Reference categories given in parentheses. ADL = activity of daily living; OR = odds ratio; 95% CI = 95% confidence interval; BMI = body mass index.

Table 4 presents the results of a multivariate analysis predicting odds of any ADL limitation at followup among subjects who were not disabled at baseline, as a function of positive affect score at baseline controlling for demographic variables, number of medical conditions, negative affect, and BMI. There was a significant association between high positive affect (score = 12) and reduced risk of ADL disability 2 years later, controlling for baseline sociodemographic variables, medical conditions, and negative affect (OR 0.46, 95% CI 0.22–0.94). Positive affect was also used as a continuous variable in a logistic regression model and included the variables listed above. Each unit increase in positive affect score at baseline (0–12) was associated with a 9% decreased risk of reporting any ADL limitation (OR 0.91, 95% CI 0.85–0.98).

A number of 2-way interactions were tested for positive affect. The only significant interaction was positive affect by sex (OR 1.17, 95% CI 1.00–1.37). Men who scored in the top 2 quartiles (score ≥ 10) were significantly less likely to report any ADL limitation at followup, controlling for demographic variables, number of medical conditions, negative affect, and BMI. A nonsignificant relationship between positive affect score and ADL disability was observed for women (Table 4).

DISCUSSION

The objective of this study was to assess the relationship between positive affect and subsequent ADL disability in older Mexican Americans with arthritis. We found that higher scores of positive affect at baseline were associated with a lower incidence of ADL disability 2 years later, controlling for sociodemographic variables, prevalent major medical conditions, and respondents' scores on the negative affect questions of the CES-D scale at baseline.

It is important to note that the effect of positive affect on ADL was independent of negative affect. In fact, controlling for negative affect in the overall sample had little effect on the strength of association of positive affect with ADL incidence. Bradburn and Caplovitz (40) and other investigators (41,42) have argued that the absence of negative affect is not the same as the presence of positive affect (18). Measures of positive and negative affect have been shown to be weakly correlated with each other (18,20,43) and share common correlates, such as physical health.

Individuals with arthritis and high positive affect may reduce their risk of becoming ADL disabled through different mechanisms. First, they may have healthier lifestyles and a better adherence to treatment regimens. Second, positive affect may be a measure of an individual's resilience in the face of stress and capacity to cope with stress. Third, they may be able to cope with environmental or physical stressors that lead to better maintenance of physiologic homeostasis.

Escalante and del Rincon (44,45) have developed a map of the disablement process in rheumatoid arthritis, where they emphasize the influence of psychosocial fac-

Table 4. Multivariate analysis predicting odds of any ADL limitation at followup among nondisabled older Mexican Americans with arthritis stratified by sex*

Independent variable	Total sample OR (95% CI) n = 781	Male OR (95% CI) n = 229	Female OR (95% CI) n = 552
Positive affect score			
0–6	1.00	1.00	1.00
7–9	0.85 (0.47–1.56)	0.63 (0.20–2.00)	0.94 (0.47–1.88)
10–11	0.45 (0.19–1.02)	0.17 (0.03–0.96)	0.69 (0.27–1.75)
12	0.46 (0.22–0.94)	0.05 (0.01–0.49)	0.73 (0.33–1.62)
Negative affect score (≥1)	0.66 (0.35–1.25)	0.42 (0.08–2.23)	0.71 (0.36–1.40)
Age (1 year increase)	1.12 (1.07–1.16)	2.14 (0.74–6.13)	2.83 (1.61–4.98)
Gender (female)	1.38 (0.75–2.56)	—	—
Marital status (married)	1.01 (0.59–1.72)	0.52 (0.16–1.70)	0.96 (0.55–1.70)
Education (≥8 years)	0.86 (0.47–1.59)	1.34 (0.42–4.30)	0.65 (0.31–1.34)
Number of medical conditions	1.59 (1.24–2.06)	1.36 (0.84–2.20)	1.66 (1.23–2.24)
BMI (≥30 kg/m^2)	1.23 (0.74–2.04)	0.76 (0.22–2.63)	1.17 (0.67–2.04)

* Reference categories given in parentheses. ADL = activity of daily living; OR = odds ratio; 95% CI = 95% confidence interval; BMI = body mass index.

tors on the disablement process. Their proposed model provides a framework to study factors that can prevent disability. The model specifies stages at which disabling factors, such as depressive symptoms, stress, self efficacy, and coping, exert their influence on the disability process. This may allow clinicians to broaden their understanding of the disability process. Similarly, previous researchers have demonstrated that high positive affect is a protective factor against functional decline in older populations with myocardial infarction and stroke (15,27,28,46) and is associated with increased survival in older populations (15).

Also, we found an interaction effect between positive affect and sex, with positive affect associated with a larger reduction in risk of ADL dependence in men than in women. Additional studies are needed to replicate our findings that positive affect is more protective against disability in men than in women.

Little is known about factors that allow individuals to maintain positive affect in the face of disabling conditions. More research is needed to examine the role that positive affect plays in the psychological adaptation to disease. It is likely that the ability to maintain high levels of positive affect enables individuals to persevere in the face of obstacles and to recover more rapidly from illness.

Our study has some limitations. First is our reliance on self-reported physician diagnosis of arthritis. This allows for errors by both physicians and subjects. Diagnosing arthritis in the elderly is particularly difficult because virtually all older adults have radiographic evidence of degenerative joint changes. The correlation among symptoms (e.g., pain), signs (e.g., crepitus, swelling, joint instability), and radiographic changes is also poor in those aged 65 years and older, compared with younger populations (47). Thus, the determination of arthritis, particularly in epidemiologic surveys, is always somewhat arbitrary. Second, the association between positive affect and decreased risk of subsequent disability is not necessary causal. It is possible that this association is due to some unmeasured correlate of both. However, this association remained after controlling for relevant factors.

Finally, our measure of positive affect is relatively crude. Because positive affect encompasses such overlapping concepts as happiness, self efficacy, personal growth, optimism, autonomy, and morale, one could argue that it would not be well represented by a 4-item scale (23). However, this scale was relatively robust and an independent predictor of future functional disability.

In summary, our results suggest that a high positive affect is associated with lower incidence of ADL disability among older Mexican Americans with arthritis. These findings provide evidence indicating the importance of promoting and helping older adults maintain a high level of emotional wellbeing. The development of comprehensive programs that include attention of emotional state may aid in preventing disability experienced by older arthritis patients.

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