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Chronic Rheumatologic Symptoms in a Tri-Ethnic Sample of Men and Women Aged 75 and Older

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Background. The high prevalence of musculoskeletal symptoms in elderly persons tends to obscure the recognition of specific medical conditions. The purpose of this study is to describe the prevalence of chronic rheumatologic symptoms and the associated measures of health status in an older population.

Methods. This is a cross-sectional study of 507 noninstitutionalized tri-ethnic men and women aged 75 and older living in Galveston County, Texas. A home interview collected data on demographics, chronic medical conditions, cognition, depression, and functional status. Site, severity, and duration of rheumatologic symptoms such as morning stiffness, body tenderness, and body aching in the past month were also collected.

Results. There was a high prevalence of nonspecific rheumatologic symptoms such as morning stiffness (32% in the shoulder girdle, 31% in the hip girdle), tenderness to touch (9%), and generalized body aching (11%) in the study population. Twenty-one percent of the subjects reported either bilateral shoulder or hip girdle stiffness or tenderness lasting more than 30 minutes almost every day or every day or generalized body aching most of the time during the past month. Age-, gender-, and ethnicity-adjusted multivariate analyses showed that more than three self-reported chronic medical conditions, poor or fair self-reported health, impairment in instrumental activities of daily living (IADL), and the presence of depressive or anxiety symptoms were associated with the presence of these chronic rheumatologic symptoms.

Conclusion. Chronic rheumatologic symptoms are common in people aged 75 and older. Such symptoms are markers for underlying poor health and for anxiety and depression among older subjects.

MUSCULOSKELETAL disorders are the leading cause of pain and disability among people aged 65 years and older (1–3). Nearly two-thirds of the women and more than half of the men in this population present to their physicians with pain or limitations of function related to a musculoskeletal disorder (2).

Diagnosing specific musculoskeletal disorders in older adults presents a unique challenge. Radiologic findings of osteoarthritis are highly prevalent but correlate poorly with symptoms and physical findings (4). Commonly used serologic tests, such as rheumatoid factor and antinuclear antibodies, have very poor positive predictive value in elderly persons (5). In addition, nonspecific rheumatologic symptoms such as morning stiffness, muscle tenderness, or total body aching overlap with a broad range of disorders including rheumatoid arthritis, polymyalgia rheumatica (PMR), and fibromyalgia.

Somatic complaints in the elderly population are very common (1,2,6). Elderly patients have multiple chronic medical conditions that may contribute to the overall somatic complaints, which masks the specificity of musculoskeletal disorders. Whereas the prevalence of joint pain and physician-diagnosed arthritis has been relatively well studied, there is very little information on the prevalence of the nonspecific rheumatologic symptoms such as stiffness, tenderness, and fatigue, particularly among older populations. Because there are often no gold standards in diagnosing musculoskeletal disorders in elderly persons, the high prevalence of musculoskeletal complaints tends to obscure the recognition of these specific diseases.

The purpose of this population-based study of men and women aged 75 and over is to describe the prevalence of nonspecific rheumatologic symptoms such as morning stiffness, muscle tenderness, and generalized body aching among three ethnic groups. We also examine the relationship between these symptoms and chronic medical conditions, functional status, and other measures of health status.

Methods

The data for this study come from the baseline survey of a population-based sample of noninstitutionalized men and women aged 75 and older living in Galveston County, Texas. The methods used for sampling and data collection are discussed elsewhere (7). The list of all residents of Galveston County 75 years or older as of February 1, 1995 were identified by a master enrollment file of Medicare beneficiaries obtained from the Health Care Financing Administration (HCFA). Exclusion of those subjects misclassified as living in Galveston County and those who listed a nursing home as their permanent address resulted in a target population of 9945. Differential sampling was performed to ensure equal numbers of three ethnic groups (African Americans, Hispanic Americans, and non-Hispanic white Americans) and equal numbers of men and women in each category. Hispanic Americans were identified by surname, forming the first subgroup; African Americans were separated on a second subgroup on the basis of Medicare racial identification; the remaining individuals formed the third subgroup of non-Hispanic whites. The final sample consisted of 200 Hispanic Americans, 201 African Americans, and 200 non-His-

panic whites. Ethnic group membership as classified by HCFA was confirmed in the face-to-face interviews by asking respondents how they self-identified, which determined the final categorization by ethnicity. Correlation between the HCFA list and self-identification was very high (99%). Six women with Hispanic surnames were included in the non-Hispanic white category on the basis of this self-identification. Of the Hispanic Americans, a majority (87%) identified themselves as Mexican Americans.

Trained bilingual interviewers conducted in-home interviews. Interviews were conducted in either Spanish or English, depending on subject preference. Fifteen percent (n = 94) of the interviews were conducted with a knowledgeable proxy respondent because those subjects were too ill or were believed by family members to be cognitively impaired. As compared with respondents included in this study sample, proxy subjects were more likely to be older than 80 years of age (65% vs 55%), were more likely to be Hispanic Americans (50% vs 30%), and were more likely to have had fewer than 8 years of education (100% vs 51%). Proxy data were excluded from the current analyses due to a lack of information pertaining to the objectives studied. As a result, our study sample consisted of 507 individuals including 177 African Americans, 153 Hispanic Americans, and 177 non-Hispanic white Americans.

Data collected included age, marital status, annual income, level of education, living arrangements, chronic medical conditions, self-reported health status, and functional status. Chronic medical conditions were assessed by asking subjects if they have been told by a physician that they had any of the following diseases: stroke, cancer, diabetes, hypertension, osteoporosis, kidney disease, prostate problems, respiratory problems, hip fracture, heart disease, and arthritis. These questions were similar to questions used in the Established Populations for Epidemiologic Studies of the Elderly to assess health conditions (8). Depressive symptoms were measured with the Center for Epidemiologic Studies–Depression Scale (CES-D) (9–10). The CES-D contains 20 items, each corresponding to a specific symptom of depression. The frequency with which each symptom had been experienced in the preceding week was assessed on 4-point scale. Anxiety symptoms were measured with the Zung Self Rating Anxiety Scale (Zung SAS) (11). This scale is based on the presence of 20 specific anxiety symptoms during the past week. Cognitive impairment was assessed using the Pfeiffer Mini Mental Exam (12). Subjects' self-care abilities were measured using the Katz Activities of Daily Living scale (ADL) (13) and the instrumental activities of daily living (IADL) (14).

Subjects were also asked a series of questions to assess their nonspecific rheumatological symptoms in the past month. Arthritis symptom questions used in The National Health and Nutrition Examination Survey were modified in this study to assess more nonspecific rheumatological symptoms (15). Similar questions have also been used in Hispanic Established Populations for Epidemiologic Study of the Elderly (16). Self-reports of musculoskeletal symptoms in elderly subjects have been shown to be valid in comparison to a standardized physician examination (17). Subjects were asked whether they had experienced any specific rheumatologic symptoms such as morning stiffness, muscle tenderness, or generalized body aching in the past month. For those who responded yes to the above question, the duration and distribution of these symptoms were also determined. For example, "In the past month how often did you wake up with stiffness in your upper arms or shoulders? Is it a few times, about half of the time, almost every day, every day?" For those who responded yes to any of the above options were asked, "Was this stiffness on one side only or both sides?", "How long did this stiffness usually last? Is it less than 30 minutes, 30–59 minutes, 1 hour or more, most of the day or all day?" Similar questions were asked regarding stiffness in the hips and thighs. Information on muscle tenderness was obtained by asking, "In the past month were the muscles of your shoulders or arms tender to the touch most of the time? Was this on one side or both sides?" Similar questions were asked regarding tenderness in the hips and thighs. Generalized body aching was assessed by asking whether the statement "I ached all over my body most of the time in the past month" was true, partly true, or not true at all. Subjects who responded "true" were considered to have generalized body aching most of the time in the past month. Subjects who reported the presence of (i) bilateral morning stiffness either in the shoulders or the hips, lasting more than 30 minutes, every day or almost every day during the past month; (ii) bilateral muscle tenderness either in shoulders or hips, most of the time during the past month; or (iii) generalized body aching most of the time during the past month were defined as a subgroup with chronic rheumatologic symptoms.

Data Analysis

All analyses in this study were conducted with weighted data to reflect the overall population of adults aged 75 and older in Galveston County, Texas, using SUDAAN version 7.5 (Research Triangle Institute, Research Triangle Park, NC) (18). Data were dichotomized on the basis of demographic, medical, and functional characteristics as follows: age <80 versus ≥ 80 years, education ≤ 8 versus >8 years, and annual income $<\$15{,}000$ versus $\geq \$15{,}000$/year. Subjects were also dichotomized on the basis of the number of chronic medical conditions (≤ 3 or >3) and of their self-reported health status as excellent/good versus fair/poor. Subjects scoring 16 or more points in the CES-D scale were considered to have high depressive symptoms, those scoring ≥ 12 were considered to have high anxiety symptoms, and those subjects scoring ≥ 6 in the Pfeiffer Mini Mental Exam were considered cognitively impaired. Subjects were considered to have depressive or anxiety symptoms if they scored either 16 or more points in the CES-D scale or 12 or more points in the Zung SAS. Subjects were classified as functionally impaired in ADL or IADL if they needed help with one or more activities. The prevalence of chronic nonspecific rheumatologic symptoms was described using simple cross-tabulations. Cross-tabulations with chi square analyses were done to describe the demographic and medical characteristics associated with chronic rheumatologic symptoms.

The purpose of our analyses was to identify the clinically accessible factors associated with chronic rheumatologic

symptoms. Because we did not collect all the potential independent factors associated with chronic rheumatologic symptoms, we ran a series of logistic regression models adjusting only for age, gender, and race to assess the magnitude of association between clinically relevant individual characteristics with chronic rheumatologic symptoms. The analyses were considered significant if the p value was $\leq .05$.

Results

Table 1 shows the demographic and medical characteristics of the weighted sample of men and women aged 75 and older. Fifty-five percent of subjects were older than 80 years of age, two-thirds were women, and 36% were married. One-third of the subjects had less than 9 years of education, and 59% had an annual income of <$15,000. Compared with non-Hispanic whites and Hispanic Americans, African Americans were more likely to be older, not married, impaired in ADL and IADL, and were more likely to report anxiety and depressive symptoms.

Table 2 shows the prevalence of nonspecific rhematologic symptoms in the past month stratified by gender and race. Thirty-two percent of all subjects reported morning stiffness in the shoulder girdle, and 31% reported morning stiffness in the hip girdle. Among all subjects with morning stiffness, two two-thirds had bilateral stiffness, and approximately half had symptoms lasting more than 30 minutes each morning. Nine percent of the subjects reported either shoulder or hip girdle tenderness to touch, and 11% had experienced generalized body aching all or most of the time in the past month. Morning stiffness was more common among African Americans and less common among Hispanic Americans compared with non-Hispanic whites. With the exception of morning stiffness in hips or thighs, there were no major gender differences in these symptoms.

Overall, 105 subjects (21%) experienced bilateral morning stiffness or tenderness either in the shoulders or hips, lasting more than 30 minutes, every day or almost every day during the past month; or generalized body aching all or most of the time during the past month. We call this constellation of symptoms chronic rheumatologic symptoms. Table 3 shows the prevalence of chronic rheumatologic symptoms by demographic and medical characteristics. The prevalence varied by ethnicity, with Hispanic Americans reporting the lowest prevalence and African Americans reporting the highest. Other characteristics significantly associated with chronic rheumatologic symptoms included comorbidity, self-reported health, depressive symptoms, anxiety symptoms, and impairment of the IADL. Age, gender, education, income, cognitive impairment, and ADL impairment were not associated with the presence of chronic rheumatologic symptoms.

Table 4 presents logistic regression models showing the magnitude of the association between each characteristic and the presence of chronic rheumatologic symptoms, adjusted for age, gender, and ethnicity. Subjects with more

Table 1. Demographic and Medical Characteristics (Weighted Percentages) of Non-Hispanic White, African American, and Hispanic American Subjects Aged 75 Years and Older in Galveston County, Texas ($N = 507$)

Characteristics	Total[†]	Non-Hispanic White[‡]	African American[‡]	Hispanic American[‡]
Age				
75–79 y	45	47	38	47
80–100 y	55	53	62	53
Gender				
Men	35	35	34	46
Women	65	65	66	54
Married	36	37	28	48
Living Alone	44	44	46	30
Education				
≤8 y	31	23	51	80
>8 y	69	77	49	20
Annual Income				
<$15,000	59	50	88	81
≥$15,000	41	50	12	19
Self-reported Medical Conditions >3	21	22	22	12
Self-reported Health				
Poor/fair	46	41	61	60
Excellent/good	54	59	39	40
Depressive Symptoms	13	12	17	16
Anxiety Symptoms	21	19	30	21
Cognitive Impairment	4	<1	15	14
Impairment in ADLs	6	4	13	9
Impairment in IADLs	42	40	53	40

Note: ADLs = activities of daily living; IADLs = instrumental activities of daily living.

[†]The percentages given in the "Total" column represent the averages weighted for the ethnic and gender distribution of the 75 year and older population of Galveston County, Texas.

[‡]The percentages given in the right three columns represent the averages for the three ethnicities weighted for the gender distribution of each ethnicity in Galveston County.

than three self-reported medical conditions, with poor or fair self-reported health, and with impairment in IADL were more likely to report chronic rheumatologic symptoms. Subjects with high levels of depressive symptoms were nearly 4 times and subjects with high anxiety symptoms were 8 times more likely to experience these chronic rheumatic symptoms. In a multivariate model including all variables significant in bivariate analyses, self-reported poor or fair health (odds ratio [OR] 3.6, 95% confidence interval [CI] 1.7, 7.8), and depressive or anxiety symptoms (OR 6.0, 95% CI 2.9, 12.4) remain significantly associated with chronic rheumatologic symptoms.

Discussion

The findings of this study can be summarized as follows. There was a high prevalence of nonspecific rheumatologic symptoms such as morning stiffness, muscle tenderness, and body aching in the population aged 75 and over. A substantial proportion (21%) experienced morning stiffness or tenderness in the shoulder or hip girdle, or aching all over, lasting at least 30 minutes or more, every day or almost every day in the previous month. This constellation of symptoms, which we term chronic rheumatologic symptoms, was associated with poorer self-rated health and the presence of high depression or high anxiety symptoms.

The association between anxiety and depression on the one hand and nonspecific rheumatologic symptoms on the other may be causal, but it is unclear in what direction the causality flows. The increased prevalence of depressive and anxiety symptoms could be explained as depression and anxiety presenting with somatic symptoms or, alternatively, the presence of chronic rheumatologic symptoms could contribute to depression and anxiety (19).

Depression and anxiety have been reported to be highly prevalent but are underdiagnosed in the older population (20–23). Depressive symptoms are particularly common in persons older than 75 years. Even minor and subsyndromal depressive and anxiety symptoms are associated with excess morbidity, increased functional impairment, and health service use (24,25). For the clinician, the presence of chronic rheumatologic symptoms in an older patient might serve as a prompt to screen for depression or anxiety.

In bivariate analyses, African Americans had the highest prevalence of chronic rheumatologic symptoms, whereas Hispanic Americans had the lowest prevalence compared with non-Hispanic whites. These differences probably reflect differences in the underlying prevalence of comorbidity, and anxiety, and depression in these three ethnic groups (Table 1), because there were no differences in rheumatologic symptoms by ethnicity in multivariate analyses that included comorbidity, anxiety, and depression.

The constellation of prolonged shoulder and hip girdle

Table 2. Prevalence of Nonspecific Rheumatologic Symptoms in the Past Month Among Non-Hispanic White, African American, and Hispanic American Subjects Aged 75 Years and Older in Galveston County, Texas (Weighted Percentages)

	Total (N = 507)	Men (n = 250)	Women (n = 257)	Non-Hispanic White (n = 177)	African American (n = 177)	Hispanic American (n = 153)
Morning stiffness in the shoulder girdle						
A few times	18	23	15	16	30	12
About half the time	2	3	1	2	4	3
Almost every day	5	5	6	5	6	1
Every day	7	5	8	6	13	5
Among those with any stiffness in the shoulder girdle						
Bilateral stiffness	63	61	64	65	59	61
Duration of stiffness						
<30 min	52	49	55	53	50	48
30–59 min	20	18	21	20	20	15
1 h or more	7	9	7	4	14	23
Most of the day/all day	20	24	18	22	16	15
Morning stiffness in hip girdle						
A few times	13	12	13	11	23	9
About half the time	1	1	1	0	5	1
Almost every day	8	5	9	8	5	3
Every day	9	3	12	9	9	2
Among those with any stiffness in hip girdle						
Bilateral stiffness	63	52	67	66	54	50
Duration of stiffness						
<30 min	44	48	44	47	40	34
30–59 min	19	14	21	18	24	21
1 h or more	9	13	8	7	15	21
Most of the day/all day	25	25	27	28	21	25
Tender to touch—muscles of shoulder girdle						
Tender to touch	9	9	9	6	22	15
Percentage of those with bilateral tenderness	47	48	46	27	68	60
Tender to touch—muscles of hip girdle						
Tender to touch	9	7	9	6	23	6
Percentage of those with bilateral tenderness	45	52	42	33	58	55
Ached all over the body all or most of the time	11	12	11	13	3	7

Table 3. Prevalence of Chronic Rheumatologic Symptoms[†] by Demographic and Medical Characteristics Among Non-Hispanic White, African American, and Hispanic American Subjects Aged 75 Years and Older ($N = 507$)

Characteristics	Weighted %[‡]	p Value[§]
Age		.442
75–79	20	
80+	24	
Gender		.136
Male	17	
Female	24	
Race		.035
Non-Hispanic whites	21	
African Americans	27	
Hispanic Americans	15	
Education		.302
0–8 y	26	
>8 y	20	
Annual Income		.143
<$15,000	23	
≥$15,000	15	
Living Alone		.880
Yes	22	
No	22	
Number of Self-reported Medical Conditions		.007
0–3	18	
>3	38	
Self-reported Health		.001
Excellent/good	9	
Poor/fair	37	
Depressive Symptoms[‖]		.007
Yes	45	
No	18	
Anxiety Symptoms[¶]		.001
Yes	58	
No	14	
Cognitive Impairment[#]		.868
Yes	23	
No	22	
Impairment in One or More ADL		.997
Yes	22	
No	22	
Impairment in One or More IADL		.026
Yes	29	
No	17	

Note: ADL = activity of daily living; IADL = instrumental activity of daily living.

[†]Chronic nonspecific rheumatological symptoms is defined as those subjects experiencing bilateral shoulder or hip girdle stiffness or tenderness, lasting more than 30 minutes almost every day or every day, or aching all over the body all or most of the time during last month.

[‡]The prevalence calculations by characteristics were adjusted for sampling design (i.e., adjusted for gender and ethnicity).

[§]Chi-square.

[‖]Subjects scoring ≥16 on the CES-D depression scale are considered to have depressive symptoms.

[¶]Subjects scoring ≥12 on the Zung anxiety scale are considered to have anxiety symptoms.

[#]Subjects scoring 6 or more on the Pfeiffer cognitive function scale are considered cognitively impaired.

Table 4. Factors Associated With the Presence of Chronic Rheumatologic Symptoms[†] Among Non-Hispanic White, African American, and Hispanic American Subjects Aged 75 Years and Older, Adjusted for Age, Gender, and Ethnicity

Characteristics	Odds Ratio[‡]	95% Confidence Interval
Age (increase of one year)	1.02	0.96–1.09
Female	1.55	0.87–2.79
African Americans (vs whites)	1.37	0.81–2.31
Hispanic Americans (vs whites)	0.66	0.37–1.20
Living alone	0.95	0.51–1.77
≤8 y of education	0.67	0.34–1.31
Annual income of <$15,000	0.67	0.31–1.47
>3 self-reported medical conditions	2.74	1.37–5.47
Poor/fair self-reported health (vs excellent/good)	7.16	3.35–15.32
High depressive symptoms[§]	3.68	1.69–8.01
High anxiety symptoms[‖]	8.41	4.23–16.7
Cognitive impairment[¶]	0.96	0.42–2.15
Impairment in one or more ADL	0.93	0.33–2.62
Impairment in one or more IADL	1.97	1.03–3.74

Note: ADL = activity of daily living; IADL = instrumental activity of daily living.

[†]Chronic nonspecific rheumatological symptoms describes those subjects experiencing bilateral upper or lower girdle stiffness lasting more than 30 min almost every day or every day, bilateral upper arms or thighs tenderness most of the time, or aching all over the body most of the time during the past months.

[‡]Logistic regression models showing the magnitude of association of each individual characteristic with chronic nonspecific rheumatological symptoms, controlling for age, gender, and race.

[§]Subjects scoring ≥16 on the CES-D depression scale are considered to have high depressive symptoms.

[‖]Subjects scoring ≥12 on the Zung anxiety scale are considered to have high anxiety symptoms.

[¶]Subjects scoring 6 or more on the Pfeiffer cognitive function scale are considered cognitively impaired.

stiffness or tenderness, or aching all over, is similar to the presentation of PMR (26). PMR is a disease that inflicts elderly persons and is typified by proximal muscle aching or stiffness or tenderness, an elevated erythrocyte sedimentation rate, and a prompt and dramatic response to a therapeutic trial of low-dose corticosteroids. PMR is often unrecognized in the community (26–28). This would appear to be true particularly among ethnic groups with poor access to medical care (27). The findings of the current study suggest that one contributing factor to the under-recognition of PMR is the high background of rheumatic symptoms in the general population of older patients. With 20% of the elderly population experiencing symptoms reminiscent of PMR, it may be difficult for primary care physicians to recognize the 1% who actually have PMR. Subjects with late complications of medical conditions such as stroke, diabetes, or chronic renal failure can present with similar nonspecific rheumatological symptoms. In our study, subjects with a history of arthritis (OR 5.1, 95% CI 2.5, 10.5) or diabetes (OR 2.4, 95% CI 1.1, 5.4) were more likely to experience these chronic rheumatological symptoms.

The presence of musculoskeletal pain has been shown to be associated with physical disability in community-dwelling elderly persons (29-–30). We found an association between the presence of chronic nonspecific rheumatologic symptoms and the impairment in the performance of the IADL but not of the ADL.

This investigation should be interpreted with recognition of the limitations in its methodology. The degree in which these findings in Galveston County, Texas can be extrapo-

lated to other geographic areas is unclear. The majority of the non-Hispanic whites and African Americans in our study were born in the Galveston area, whereas half of the older Hispanics were born in Mexico. In addition, although this was a population-based sample, it excluded certain frail older subjects such as those institutionalized and those for whom a proxy interview was obtained. A small proportion of elderly persons who were not on the HCFA rolls (i.e., those without Medicare coverage) were also excluded. Finally, in this cross sectional study, we cannot infer any causal relationships between chronic rheumatologic symptoms and the presence of anxiety or depression symptoms.

In conclusion, nonspecific rheumatologic symptoms are common in the population aged 75 and older. It would appear that such symptoms are particularly frequent among older patients with symptoms of anxiety or depression. Such symptoms should prompt the physician to screen for those conditions.

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Dr. Luis Postigo, who is currently practicing medicine at Goliad, Texas, was a fellow in Geriatric Medicine at UTMB while preparing this manuscript.

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