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Psychosocial stress and anxiety in musculoskeletal pain patients with and without depression

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Abstract

Objective—Determine if psychosocial stress and anxiety were associated with depression severity in primary care patients with chronic musculoskeletal pain.

Method—A cross-sectional sample of 500 primary care patients with musculoskeletal pain (250 with depression and 250 without depression) were assessed for anxiety, psychosocial stress, depression severity, and demographics. The depressed and nondepressed participants were compared using t-test and chi-square analyses. Multiple linear regression analyses evaluated the respective associations of psychosocial stressors and anxiety with SCL-20 depression severity across all 500 participants.

Results—Compared with nondepressed patients, the depressed patients reported significantly more psychosocial stressors and more severe anxiety. Depressed patients reported a higher frequency of difficulties with every psychosocial stressor assessed. After controlling for covariates, both anxiety and psychosocial stressors were associated with depression severity.

Conclusion—Both anxiety and psychosocial stress should be considered in the assessment and treatment of patients with musculoskeletal pain and depression. Psychosocial stressors among patients with pain may have an impact on depression beyond that of anxiety. Tailored, integrated treatments that target the psychosocial needs of patients with pain and depression are needed. In addition to pharmacotherapy, psychotherapy and other behavioral treatments may be especially important for depression complicated by anxiety or psychosocial stress.

Keywords

Depression; pain; psychosocial stress; anxiety

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Introduction

Chronic pain is highly prevalent and disabling, affecting between 25-33% of adults in the community [1,2]. Pain is the most common reason primary care patients seek treatment [3], accounting for 40% of all problem-focused outpatient visits [4]. While exact estimates vary, chronic pain costs the U.S. tens of billions of dollars annually in lost productivity and health care expense [5,6]. Of all pain conditions, musculoskeletal pain conditions are among the most common, affecting approximately one-half of all patients presenting with pain in primary care [7].

Chronic pain and depression frequently co-occur: individuals with pain are at increased risk for depression and individuals with depression are at increased risk for pain [8-10]. Approximately one-fourth of patients with pain in primary care meet criteria for clinical depression [11]. Pain patients with depression report more severe pain, greater disability, lower functioning, and poorer treatment outcomes for their pain [11]. Among patients with chronic pain, understanding the differences between those with and without depression would facilitate development of tailored interventions to effectively manage patients who have both pain and depression.

Understanding the context of patients' lives is important to understanding depression in patients with pain. Pain may be associated with increased stress, and reduced resilience and coping capability when faced with stressful and traumatic life events [12]. Living with pain can lead to social isolation, interrupted ability to maintain roles such as grocery shopping and child care, and increased dependence on others for support. Financial security is often compromised by job loss, work disability, and high health care expenses; lower income is associated with more pain problems [2,13].

Anxiety is also common among patients with pain and depression. Anxiety disorders have been found in 35% of chronic pain patients, compared to 18% of the general population [14]. Co-morbid anxiety and depression is common among chronic pain patients [15-18]. Finally, the likelihood for anxiety increases among individuals faced with psychosocial stress [19]. Patients with pain who report anxiety symptoms in the context of psychosocial stress may also be more likely to report greater depressive symptoms.

There is clear evidence that pain [e.g. 11], psychosocial stress [e.g. 20], and anxiety [e.g. 21] are each linked with depression. Yet few studies have attempted to integrate these factors to understand the common but complex clinical presentations of pain patients with depression. Increased understanding is needed regarding the prevalence of anxiety and psychosocial stress among chronic pain patients with and without depression, and the relative contributions of these factors to depressive severity in this population.

We aimed to evaluate the associations of psychosocial stress and anxiety with depression in a cross-sectional sample of primary care patients with chronic musculoskeletal pain. We hypothesized that in patients with musculoskeletal pain, severe psychosocial stress would be associated with more severe depression. We also hypothesized that the presence of anxiety would increase the relationship between psychosocial stressors and depression in this patient population.

Method

Study Design

Baseline data from the Stepped Care for Affective Disorders and Musculoskeletal Pain (SCAMP) were analyzed for this study. The study design is described in more detail elsewhere [22]. Briefly, 500 primary care patients with persistent low back, hip or knee pain were enrolled. Half the sample met criteria for comorbid depression, and half reported no depression. The 250 patients with pain and depression were enrolled in a 12-month randomized clinical trial testing the effectiveness of a stepped care intervention consisting of optimized anti-depressant medications and a 6-session pain self-management program delivered by a nurse care manager. The cohort of 250 patients with pain but no depression was followed longitudinally as a control group and to identify frequency and predictors of depression in patients with musculoskeletal pain. This cross-sectional study uses only data gathered prior to the delivery of the intervention and includes all 500 patients in the sample.

Participants were recruited between December 2005 and June 2007 from two sites in Indianapolis, Indiana: the Indiana University Medical Group Primary Care clinics affiliated with Wishard Hospital, which serve predominantly inner-city, low-income patients; and the Richard L. Roudebush Veterans Administration Medical Center general medicine clinics, which serve primarily older male veterans. Computerized medical records were reviewed to identify patients with ICD-9 diagnoses of low back pain, osteoarthritis, hip pain, or knee pain who had at least one primary care visit within the preceding 12 months. Enrollment occurred with approval from the primary care physician either during scheduled clinic visits or through telephone contact two weeks following a mailed study letter.

Informed consent was obtained by a research assistant, who then conducted the baseline interview and administered the assessment measures either in person or by telephone. Participants were compensated \$25 for the baseline and subsequent follow-up assessments. The Indiana University Institutional Review Board and Roudebush VA Medical Center Research and Development Committee approved all study procedures.

Participants

To qualify, participants' pain: 1) was located in the low back, hip, or knee; 2) persisted 3 months or longer despite conventional analgesic treatment, defined as use of two different analgesics; and 3) was of at least moderately severe intensity, defined as a score ≥ 5 on the Brief Pain Inventory. Patients in the depressed group were required to have a Patient Health Questionnaire (PHQ) score ≥ 10 (moderately severe depression or greater), a threshold score indicating clinically significant depression with substantial functional impairment [23], and to endorse depressed mood and/or anhedonia. Patients in the nondepressed group were required to have a PHQ-9 score ≤ 7 (minimal depressive symptoms). A PHQ-9 cutpoint of ≤ 7 (rather than < 10) was selected to more clearly delineate the nondepressed from the depressed group.

Exclusion criteria included: 1) inability to speak English; 2) moderately severe or greater cognitive impairment assessed by a 6-item cognitive screen [24]; 3) schizophrenia, bipolar disorder, or psychosis; 4) current disability claim being adjudicated for pain; 5) pregnancy or plans to become pregnant; 6) and anticipated life expectancy of less than 12 months.

Measures

Demographics included age, sex, race, ethnicity, educational level, employment status, and financial security.

Depression severity was assessed using the SCL-20, a modified subscale of the Hopkins Symptom Checklist. This scale has been used extensively to assess depression outcomes in primary care trials [25,26]. The 20 items are scored and averaged to provide a measure of overall depression severity from 0 to 4, with higher scores representing more severe depression. Scores greater than 1.7 indicate moderately severe depression.

Depression diagnoses were assessed using the PRIME-MD [27] structured interview to describe the prevalence of DSM-IV diagnoses of major depression, dysthymia, and other depression among the depressed participants.

Psychosocial stress was evaluated with the Psychosocial Stressor Scale from the PHQ, which assesses experiences with 9 common psychosocial stressors that may have occurred in the last month. Each item is rated from 0 (“not bothered at all”) to 2 (“bothered a lot”) and summed for a psychosocial stressor severity score ranging from 0 to 18. This scale was developed and validated in two studies involving 6000 patients [28,29].

Anxiety was measured by the GAD-7 [30,31], a measure designed to screen for anxiety disorders among primary care patients. The GAD-7 has been validated for the most common anxiety disorders in primary care: generalized anxiety, panic, social anxiety, and posttraumatic stress disorder. Higher scores on the GAD-7 represent more severe anxiety.

Pain disability was measured using the Graded Chronic Pain Scale [32], a 7-item measure that provides scores for pain intensity and disability. The pain disability score was selected as the measure of pain severity for this study because of its clinical relevance and use in other pain studies [33]. Internal consistency, test-retest reliability, and validation studies show that the GCPS is associated with independent measures of pain and has strong psychometric properties [34-36].

Medical comorbidity was assessed using a validated checklist (presence/absence of 9 common medical conditions scored from 0 to 9) associated with hospitalization, costs, and mortality [37].

Statistical Analyses

Covariates included age, gender, race (Black, White, or Other), ethnicity (Hispanic or non-Hispanic), clinic site, medical comorbidity (0-9 checklist score), pain disability (Graded Chronic Pain Scale disability score), and pain location (back or hip/knee). Education (less than high school, high school, or greater than high school education), employment status (employed, unemployed/unable to work, or retired), and financial security (comfortable/ just enough to make ends meet, or not enough to make ends meet) were also included in analyses. The depressed and nondepressed participants were compared on the covariates, demographics, psychosocial stressors, and anxiety. Comparisons were conducted with t-tests for continuous variables and chi-square analyses for categorical variables. Depressed and nondepressed patients were then compared for frequency and odds ratio of “bothered a lot (2)” on each item of the psychosocial stressor scale. Last, 2 multiple linear regression analyses were conducted. First we examined the respective associations of covariates, psychosocial stressor score, and anxiety. Second, we added the interaction between anxiety and psychosocial stressors to the model.

Results

Overall Sample Characteristics

The entire sample (n = 500) included 55% women, and 56% White, 40% Black, and 4% other, with a mean age of 59.0 years (range: 21 to 88, SD = 13.4 years). Approximately 41% reported

being unemployed or unable to work, 34% retired, and 25% employed. Approximately two-thirds of participants were from the Indiana University Wishard Hospital clinics, and one-third from the VA clinics. The mean SCL-20 score of 1.89 in the depressed group represents moderately severe depression, and the score of 0.69 in the non-depressed group is consistent with minimal depression; this validates the PHQ-9 cutpoints chosen as the enrollment criterion for two study groups. Further, the PRIME-MD clinical interview established that most patients in the depressed group met criteria for either major depression (75%) or dysthymia (21%).

Characteristics of depressed versus nondepressed pain patients

Patients ($n = 250$) with musculoskeletal pain and depression were significantly younger ($p < .001$), and more likely to: a) be unemployed or unable to work ($p < .001$); b) report “not enough income to make ends meet,” ($p < .001$), and c) have back pain rather than hip or knee pain ($p = .031$), than the 250 nondepressed patients (Table 1). There were no significant differences in sex, race, education, or frequency of comorbid illness. Compared to nondepressed patients, the depressed patients reported significantly more psychosocial stressors, and more severe anxiety and pain disability. Further, Table 2 demonstrates that the depressed patients reported a higher frequency of difficulties with every life stressor assessed, with odds ratios (all with 95% CI) varying from 2.4 (“something bad that happened lately”) to 7.4 (“stress at work outside of the home or at school”).

Associations of Psychosocial Stressors and Anxiety with Depression Severity

We used multiple linear regression analysis to model SCL-20 depressive severity and the respective contributions of psychosocial stressors and anxiety, adjusting for covariates (Table 3). Age, greater pain disability, lack of financial security or “not having enough to make ends meet, and White race were each associated with greater depression severity. As hypothesized, a higher score on the psychosocial stressor scale was significantly associated with greater depression severity. For each additional point on the psychosocial stressor scale, the SCL-20 depression score was 0.04 points higher. As anticipated, anxiety was also significantly related to depression severity. For each additional point on the GAD anxiety scale, the SCL-20 depression score was 0.10 points higher. A second multiple regression analysis was conducted to test the interaction between anxiety and psychosocial stress. The interaction approached significance ($p = .057$), with psychosocial stressors showing a trend toward greater impact on depression severity among patients with lower anxiety than with higher anxiety.

To increase confidence in our results, we conducted three additional sets of analyses. To determine if the results were influenced by presence or absence of clinically significant depressive disorder status or anxiety, we re-ran the model controlling for depressed versus nondepressed group and testing the interaction between depression group status and anxiety; the results were unchanged and the interaction was not significant. Second, we stratified the sample into low anxiety ($GAD < 10$) and high anxiety ($GAD \geq 10$) groups to determine if the effect of psychosocial stress differed by level of anxiety; psychosocial stress remained significantly associated with worse depression severity in this stratified model (low anxiety: $t = 11.3$, $p < .001$; high anxiety: $t = 3.1$, $p < .01$). Third, we conducted a multiple regression model excluding anxiety to determine if the association between psychosocial stressors and depressive severity would change depending on the presence or absence of anxiety. The association between psychosocial stress and depression severity was reduced but still highly significant when anxiety was included in the model ($\beta = .043$; $t = 5.49$; $p < .001$) compared to when it was excluded ($\beta = .109$; $t = 14.83$; $p < .001$).

Discussion

As hypothesized, patients with both musculoskeletal pain and depression reported greater psychosocial stress and anxiety than those without depression. The depressed patients also reported greater pain disability, more difficulties with financial security, and greater unemployment. Further, depressed patients reported significantly more psychosocial stress on every experience evaluated. Last, in our multivariate model adjusting for covariates, anxiety and psychosocial stressors were significantly and independently associated with depression severity. There was a trend toward a significant interaction between anxiety and psychosocial stressors in relationship to depression severity.

Unique to the present study was the examination of both psychosocial stress and anxiety among a group of patients with musculoskeletal pain. Although very common among patients with depression and pain, the respective roles of anxiety and psychosocial stressors have not been considered extensively. Our findings highlight that both anxiety and psychosocial stress may be important to consider in understanding and treating the complete clinical presentation of depression among patients with pain. More tentatively based on the interaction result, the findings suggest that among patients with few anxiety symptoms, psychosocial stressors may be particularly problematic. Perhaps pain patients' with high baseline mental health functioning may become more vulnerable to depression when exposed to significant psychosocial stressors. In addition, our results suggest that the effect of stress on depressive severity may be partly mediated by the level of anxiety. Longitudinal data are needed to clarify the directionality of these associations.

While not as well studied as depression among pain patients, anxiety disorders are increasingly recognized as a significant issue among patients with pain. Anxiety disorders may be present in as many as 60% of pain patients [38]. A study conducted with the same data set used in this paper determined that over half of pain patients with depression also reported significant anxiety [18]. While mood and anxiety disorders can overlap in their clinical presentations, they also represent unique domains of symptoms and function. Our findings speak to the important role of anxiety among patients with pain and depression, and suggest that the presence of clinically significant anxiety may increase the risk for more severe depression and poorer response to depression treatments. Research to develop and evaluate interventions for patients with pain, depression, and anxiety is needed.

The majority of depression studies focus predominantly on psychiatric symptoms and diagnoses. The "real world" situations of patients' lives, such as interpersonal difficulties, financial problems, or exposure to violence, are not often taken into account. In contrast, practitioners are often aware of how their patients' personal situations and stressors can be relevant to their clinical presentations. Our findings suggest that psychosocial stressors among patients with pain may be associated with depression beyond what can be attributed to anxiety. Attending to psychosocial stressors in clinical settings may improve patients' ability to engage effectively in different treatment approaches, adhere to treatment recommendations, and demonstrate decrease in their psychiatric symptoms.

Unidentified, and consequently untreated, anxiety and psychosocial stressors may be two issues that interfere with depressed patients' abilities to obtain and sustain remission. Recent treatment studies have shown that among depressed patients, complex presentations are common, and remission of depressive symptoms is difficult to obtain and maintain. In the landmark STAR*D depression treatment trial, for example, two-thirds of depressed patients had a co-morbid psychiatric disorder (the most common being anxiety in 45%), and two-thirds were not remitted after initial treatment [39]. Even after up to four antidepressant changes and dose adjustments, one-third of patients had residual depression symptoms. Furthermore, other studies have found

that more than one-half of patients who do obtain depression remission continue to report residual symptoms that impair function and increased the risk for relapse [40-42]. These findings highlight that some individuals with major depression find it particularly chronic and treatment-resistant. Depressed individuals with co-occurring problems such as anxiety and psychosocial stressors may require augmented treatment, more intensive treatment, or specialized treatment. Closer monitoring of patients' responses to pharmacotherapy and psychotherapy may be indicated. Psychotherapy may play an even more important role in depressed patients with comorbid psychosocial stress and/or anxiety, and may need to be initiated earlier in the treatment process. Cognitive-behavioral therapy, interpersonal psychotherapy and problem-solving therapy are all efficacious for depression [43]. Cognitive-behavioral therapy also has established efficacy for anxiety [44] as well as chronic somatic symptoms including pain [45]. One study has suggested that problem-solving therapy may also be beneficial in patients with chronic pain and psychological distress [46]. Though more research is needed on the optimal treatment approach in patients with depression suffering from concurrent pain or other somatic symptoms, anxiety, and/or psychosocial stress, combining pharmacotherapy and psychotherapy may be warranted in patients with a suboptimal clinical response.

The primary study limitation is the cross-sectional nature of the data sample, which restricts conclusions regarding the directionality of associations between depression, anxiety and psychosocial stress. In this respect, the longitudinal relationship between this “triad” and their respective responses to treatment will be particularly informative. A comparison group of pain-free patients with depression would have allowed us to assess whether patients with comorbid depression and pain may have specific intervention needs compared to patients with depression alone. Although our measure of psychosocial stress was developed in two studies involving 6000 patients [28,29] and covers a broad range of potential stressors, it lacks specificity regarding what type of psychosocial stressors may be most problematic, and needs additional validation with other populations.

Depression is difficult to treat among patients with pain. Our findings suggest that both anxiety and psychosocial stressors contribute to greater depressive severity among patients with musculoskeletal pain. The results indicate the importance of thorough assessment of pain patients, as well as the need for appropriate treatments for depressed patients with pain who also experience psychosocial stressors and anxiety. Future studies will evaluate the impact that anxiety and psychosocial stressors have on treatment outcomes for patients with musculoskeletal pain and depression.

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Table 1

Characteristics of depressed and nondepressed patients with chronic musculoskeletal pain

	Depressed (n = 250)	Nondepressed (n = 250)	P
Age, mean	55.5 (11.8)	62.5 (14.1)	<.001
Women, %	52.8	50.8	.65
African-American, %	36.4	40.0	.59
Education, %			.065
Less than high school	24.1	26.0	
High school	41.0	31.2	
More than high school	34.9	42.8	
Employment, %			<.001
Employed	28.8	26.4	
Unemployed or unable to work	48.0	32.0	
Retired	23.2	41.6	
Income not enough to make ends meet, %	44.4	24.8	<.001
Pain location, %			.031
Back	60.4	50.4	
Hip or knee	39.6	49.6	
Clinic site, %			.72
University	59.2	60.8	
Veteran	40.8	39.2	
Stressor score (range, 0-18)	8.1 (3.8)	3.9 (3.3)	<.001
GAD-7 anxiety score (range, 0-21)	8.9 (4.4)	3.2 (3.4)	<.001
SCL-20 depression score (range, 0-4)	1.89 (0.65)	0.69 (0.53)	<.001
GCPS pain disability score (range, 0-100)	69.0 (24.9)	45.9 (29.1)	<.001
Comorbid diseases, mean no.	2.7 (1.5)	2.6 (1.4)	.55

Note: A higher score on Stressor score, GAD-7, SCL-20, GCPS indicates worse health.

Table 2

Prevalence of specific psychosocial stressors in depressed (n = 250) vs. nondepressed (n= 250) patients with chronic musculoskeletal pain.

PHQ Psychosocial Stressor	Severe Stressor (%) [†]		Odds Ratio	P
	Depressed	Non-depressed		
Financial problems or worries	51.6	20.0	4.3	< .001
Worrying about your health	50.4	17.6	4.8	< .001
Your weight or how you look	48.8	16.4	4.9	< .001
Having no one to turn to when you have a problem	34.4	8.8	5.4	< .001
The stress of taking care of children, parents, or other family members	26.0	8.0	4.0	< .001
Something bad that happened recently	25.2	12.4	2.4	< .001
Thinking or dreaming about something terrible that happened to you in the past	21.2	4.4	5.8	< .001
Difficulties with spouse or partner	18.8	8.0	2.7	< .001
Stress at work outside of the home or at school	17.6	2.8	7.4	< .001

[†] Severe includes only stressors endorsed as bothering the patient "a lot".

Table 3
Linear regression results of the effect of psychosocial stressors and anxiety on depression severity

	β	Standard Error	<i>t</i>	<i>p</i>
Covariates				
age	-.003	.002	-1.35	.177
sex	.080	.066	1.21	.227
race	-.133	.048	-2.75	.006
clinic site	-.134	.070	-1.90	.058
medical comorbidity	.023	.016	1.37	.172
pain disability	.006	.001	6.64	<.001
pain location	-.004	.044	-0.08	.936
education	.000	.005	-0.04	.967
employment status	-.006	.050	-0.13	.900
financial security	-.100	.049	-2.02	.044
Anxiety	.091	.007	13.84	<.001
Psychosocial Stressors	.043	.008	5.49	<.001