Early Identification of Co-Occurring Pain, Depression and Anxiety

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BACKGROUND: Depression and anxiety frequently co-occur with pain and may affect treatment outcomes. Early identification of these co-occurring psychiatric conditions during routine pain screening may be critical for optimal treatment.

OBJECTIVE: To determine aspects of pain related to psychological distress, and, among distressed patients, to determine whether pain factors are related to provider identification of distress.

DESIGN: Cross-sectional interview of primary care patients and their providers participating in a Veteran's Administration HELP-Vets study.

SUBJECTS: A total of 528 predominately male Veterans

MEASUREMENTS AND MAIN RESULTS: We measured self-reported pain, including a 0-10 numeric rating scale and interference items from the Brief Pain Inventory. To evaluate distress, brief indicators of depression, anxiety and PTSD were combined. A substantial number of patients had psychological distress (41%), which was even higher (62%) among patients with moderate-severe current pain. Only 29% of those with distress reported talking to their provider about emotional problems during their visit. In multivariate analyses, other pain factors related to distress included interference with enjoyment of life and relationships with others, pain in multiple locations and joint pains. Prior diagnoses of depression and anxiety were also related to current distress. Only prior diagnosis and patient reported headaches and sleep interference because of pain were related to provider identification of distress.

CONCLUSIONS: VA patients with moderate-severe pain are at high risk for psychological distress, which often goes unrecognized. Providers need to be more vigilant to mental health problems in patients experiencing high pain levels. Targeted screening for co-occurring conditions is warranted.

KEY WORDS: targeted screening for pain and distress; depression; anxiety.

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INTRODUCTION

Pain symptoms are among the primary reasons that patients seek medical care.¹ For that reason, the VA and the Joint Commission on Accreditation of Healthcare Organizations have mandated pain assessment during routine office visits using a numeric rating scale (referred to as the '5th vital sign' or NRS). At the same time, there is a substantial literature documenting the relationship between pain and psychological distress, in particular depression^{2,3} and anxiety.⁴ Given the strong association of pain with psychological distress, it may be that patients with high scores on the NRS should also be screened for depression and anxiety. In addition, there may be other pain aspects that are predictive of psychological distress and should be included in routine pain screening. While depressive and anxiety symptoms, or psychological distress, have been found to increase as the severity of pain increases,^{5,6} studies have shown that depression is more likely in patients with chronic pain⁷ and in patients who have pain in multiple parts of their bodies.^{8,9} There is also some evidence that interference with activities caused by pain is a stronger predictor of depression than pain intensity.¹⁰

This research tests to see if additional pain indicators that have not typically been examined are related to psychological distress. In addition, we test to determine whether these same pain factors, or primarily provider factors, are related to provider discussion of emotional problems for those with psychological distress. The importance of recognizing and treating depression and anxiety among patients with pain is critical as there is evidence that psychological distress may amplify pain and impair the person's capacity to adapt to severe pain,¹¹ and have a substantial effect on treatment response in those with chronic pain.^{2,12-14} Yet detection of both depression and anxiety is typically low in primary care settings (less than 50%), possibly because such patients present primarily with somatic complaints, 60% of which are pain related.² A study by Katon¹⁵ projected that if all primary care patients presenting with pain conditions were evaluated for possible depression, 60% of previously undetected depression cases might be recognized, underscoring the importance of integrating pain and distress recognition. Thus,

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given the high comorbidity between pain and distress and their combined negative impact on course of disease and response to treatment, it is important to identify factors predictive of psychological distress that should be considered for inclusion in routine pain screening.

METHODS

Subjects

The sample comes from the Helping Veterans Experience Less Pain Study, a VA-funded cross-sectional visit-based sample of patients and their providers. Patients were recruited from clinics in two hospitals and six affiliated community sites in Los Angeles, Ventura and Orange counties during the period from March 2006 to March 2007. Clinics included primary care, with a subset of patients from general cardiology and oncology.

Providers were sampled several weeks before patient enrollment began and asked to complete an attitudinal survey. Patients were approached leaving the clinic after their provider visit and screened for eligibility. Providers were not told that their patients would be interviewed after the visit. Eligible patients included those visiting participating providers, who had their vital signs measured during their visit, passed a brief cognitive test,¹⁶ had intact hearing, spoke English and agreed to have their medical records reviewed. Patients who self-reported their health as fair or poor were all sampled, and every other patient was sampled among those who self-reported their health as good or better. This sampling strategy assured an adequate sample of subjects with potentially painful health conditions. Those who agreed were interviewed. The study was approved by the Institutional Review Boards at each clinical site.

A total of 6,138 patients were approached. Of those, 862 refused screening; 4,337 were ineligible (e.g., 2,265 had not had their vital signs taken, 942 had not visited a treatment provider that day, 310 were not visiting participating clinics, 103 were visiting providers who declined to participate, 171 failed the cognitive screen, 49 were hearing impaired, 61 had previously participated and 436 patients who reported good or excellent health were purposely not sampled). Among the remaining 939 eligible patients, 650 (69.2%) completed the interview. This analysis includes 528 patients (excluding a convenience sample of cardiology patients enrolled for another study aim). Eighty-five percent of patients were from primary care clinics, 9% from cardiology and only 4% from oncology. Patients in oncology tended to report less pain, those in cardiology tended to report higher education and those in primary care were younger, but otherwise patients by site did not differ significantly by gender, race or self-reported health.

Providers in the study included 209/280 (e.g., 74% response rate), of whom 97 were staff physicians, 48 were physician extenders, and the remainder were trainees. All but two providers completed the attitudinal items used in these analyses.

Measures: Patients

Outcome: Indicators of Psychological Distress. A measure of psychological distress was created using brief screening

measures of depression (The Patient Health Questionnaire-2 or PHQ-2) and anxiety (General Anxiety Disorder-2 or GAD-2).^{17,18} The GAD-2 screens for the four most common anxiety disorders seen in primary care (generalized anxiety disorder, panic, social anxiety and post-traumatic stress disorder or PTSD). The sensitivity for PTSD is lowest using the GAD-2.¹⁸ Given the high prevalence and importance of identifying PTSD in VA patients, the PTSD-2¹⁹ was also used to screen for that specific anxiety disorder. Patients were classified as having probable psychological distress if they scored 3-6 on the PHQ-2 or GAD-2 or 4-8 on the PTSD-2.

Outcome: Addressing Mental Health Problems. Patients were asked whether or not they and their doctor or treatment provider had talked about any emotional problems they might be having, such as depression or anxiety during their visit that day.

Pain Indicators. To measure presence of and severity of pain, research assistants asked patients to rate their *current* pain level on a NRS of 0 to 10, where 0 meant no pain and 10 equaled the worst possible pain. This measure is equivalent to the 'Fifth Vital Sign' rating performed by nursing staff during vitals intake. Interference items from the Brief Pain Inventory²⁰ asked patients to rate, on similar 0 to 10 scales, how much during the past week did pain interfere with: general activity, mood, walking ability, normal work activities, interpersonal relations, sleep and enjoyment of life. For our analyses, responses to these rating scales were collapsed into indicators of (1) no pain, (2) mild pain (ratings of 1-3) and (3) moderate to severe pain (ratings of 4-10), consistent with published standards and VA policy that requires clinical follow-up of patients with moderate or greater pain.²¹

In addition, patients were asked during the interview to indicate the number of places on their body that were hurting, the degree of bother because of pain during the past week and whether or not they had experienced different types of pain (stomach pain, back pain, pain in arms, legs or joints, headaches, chest pain) in the past 4 weeks. The latter items were selected from the PHQ-15 somatization scale.²²

Other Control Variables. Other measures used in these analyses included demographics and prior diagnosis of depression or anxiety as indicated in the patient's medical record. The analysis of talking with the provider about emotional problems also included patient willingness to use anti-depressant medications prescribed for emotional problems or to use counseling from a mental health professional, both hypothesized to affect the patient's willingness to discuss emotional problems with their provider.

Measures: Providers

Provider variables included demographics (age in years, male or female gender, specialty); single item measures of the provider's confidence in detecting depression and in prescribing or managing anti-depressants; the provider's rating of ability to manage pain in depressed patients; the provider's belief that he/she was more interested than many of their peers in providing psychosocial care. In addition, two items

were included from a vignette that described an elderly man with heart failure and diffuse bodily pain who felt fatigued and depressed. Clinicians were asked to indicate how likely they would be to prescribe an antidepressant or to refer the patient to a mental health specialist.

Analysis

We evaluated the associations among psychological distress, talking to the treatment provider about emotional problems and the pain indicators. We then ran a series of stepwise logistic regressions using the presence or absence of psychological distress and talking to the treatment provider about emotional problems as the dependent variables. For psychological distress, we first entered the patient NRS and demographics as a block and then used the forward stepwise procedure in SPSS to select other significant pain indicators. Prior diagnosis of depression and prior diagnosis of anxiety were also included as candidates for the model. Because stepping algorithms may be data dependent, we cross-validated the models using a form of jackknifing. Using 90% random samples, we repeated the stepping procedure 15 times from the database and ran the stepping procedure each time. These runs were examined manually, and those variables that were selected in a majority of the runs were then included in the final model, which was then estimated on the full sample.

For the outcome "talking to the treatment provider about emotional problems" a similar procedure was followed. These runs were restricted to the sample of patients who had psychological distress. Once a model with patient indicators was determined, we used the same stepwise procedure with random samples to choose the best set of provider factors to include in the final model, forcing in patient factors as a block.

Because only every other patient was sampled among those who self-reported their health as excellent, very good or good, we weighted our analyses to adjust for undersampling of this population. The weight allows us to generalize results back to the health level of the visit-based sample. In addition, we weighted our analyses for non-response based on the age, race, general health and cognition scores of patients who refused to participate compared to those who completed the patient interview. Non-responders were slightly older than responders, but did not differ in race, cognition status, general health rating or overall nurse rating of pain. Our results were robust to clustering by provider.

RESULTS

Table 1 provides characteristics of the 528 VA patients. Consistent with national VA users, the sample was older and more likely to be male (96%) than the United States national average. Ethnicity was mixed.

A substantial number of subjects had psychological distress (41%); 29% had probable depression, 26% had probable anxiety, and 29% had probable post-traumatic stress disorder. Of those with psychological distress, only 29.4% had talked to their provider that day about any emotional problems.

The providers enrolled in the study were 53% male with a mean age of 43 years. Most were practicing in the general internal medicine clinics, with 14% having clinical training in

Table 1. Weighted Characteristics of VA Patients*

Characteristics	Mean (SD) or N (%)
Demographics	
Mean age	62.9 (12.93)
% Male	500 (96)
Ethnicity	
% White	266 (52)
% African American	128 (25)
% Hispanic	82 (16)
% Other	35 (7)
Educational level	
% High school or less	131 (25)
% Some college or more	392 (75)
Mental health measures	
Psychological distress (%)	221 (42.0)
% Probable depression	152 (29.2)
% Probable general anxiety disorder	137 (26.3)
% Probable post-traumatic stress disorder	153 (29.1)
Discussed emotional problems among distressed (%)	64/218 (29.3)
Pain measures	
Current pain rating	
No pain (%)	211 (40.2)
Mild pain (1-3)	103 (19.6)
Moderate or severe pain (4+)	211 (40.2)
Pain bother or distress	
% Not at all	90 (17.2)
% A little or somewhat	194 (37.1)
% Quite a bit or very much	238 (45.6)
% Stomach pain	155 (29.5)
% Back pain	299 (57.0)
% Pain in arms, legs, joints	377 (71.8)
% Headaches	178 (33.8)
% Chest pain	110 (21.0)
Number of places body hurts	
0	163 (31.0)
1	131 (25.0)
2	111 (21.1)
3+	120 (22.9)

*The total sample is 528. However, Ns range from 511-528 across characteristics because of missing data

cardiology and 8% in oncology. Forty-seven percent were non-Hispanic white, 34% Asian, 4% Black and 7% Hispanic. In response to the vignette, 37% of the providers said they would be very likely and 38% somewhat likely to prescribe an antidepressant. Forty-percent reported they would be very likely and 36% somewhat likely to refer the patient to a mental health specialist. Almost 86% said they were confident in detecting depression and 48% in managing antidepressants.

Many patients were in pain, with 40% of the total sample rating their current pain as moderate to severe; 46% were bothered or distressed by pain quite a bit or very much. Over 71% of the sample had pain in their arms, legs or joints, with 29% having stomach pain, 57% having back pain, 36% having headaches and 21% having chest pain.

Cross-tabulations (Tables 2 and 3) showed that psychological distress was significantly related to level of current pain ($\chi^2=43.09$, $p<0.001$); 62% of patients in moderate to severe pain had psychological distress compared to 26% in patients with no pain. In addition, psychological distress was significantly related to all other pain indicators (all p-values < 0.001).

The final model based on variables significant in the majority of the 15 stepwise regressions is shown in Table 4. When entered as a block with demographic variables, patients with moderate to severe current pain ratings were significantly

Table 2. Psychological Distress by Pain Indicators

	% With psychological distress	Overall chi-square
Level of current pain		($\chi^2=60.32$, $p<0.001$)
No pain	25.6	
Mild pain	35.0	
Moderate to severe pain	62.1	
Stomach pain		$\chi^2=43.00$, $p<0.001$
No	32.9	
Yes	63.9	
Back pain		$\chi^2=34.14$, $p<0.001$
No	27.4	
Yes	52.8	
Pain in arms, legs, joints		$\chi^2=52.97$, $p<0.001$
No	16.9	
Yes	51.7	
Headaches		$\chi^2=25.81$, $p<0.001$
No	34.2	
Yes	57.3	
Chest pain		$\chi^2=31.70$, $p<0.001$
No	35.7	
Yes	65.5	
Number of places pain		$\chi^2=76.02$, $p<0.001$
0	23.9	
1	34.4	
2	42.3	
3+	74.2	
Overall distress due to pain		$\chi^2=93.13$, $p<0.001$
Not at all	13.3	
A little bit	26.0	
Somewhat	34.8	
Quite a bit	54.1	
Very much	73.8	

Table 3. Psychological Distress by Pain Interference Items

	% With psychological distress	Overall chi-square
Pain interfered-general activities		$\chi^2=97.34$, $p<0.001$
No pain	15.7	
Mild pain	25.0	
Mod-severe pain	61.3	
Pain interfered-mood		$\chi^2=107.91$, $p<0.001$
No pain	16.7	
Mild pain	28.3	
Mod-severe pain	64.7	
Pain interfered-walking ability		$\chi^2=98.76$, $p<0.001$
No pain	16.6	
Mild pain	28.6	
Mod-severe pain	62.8	
Pain interfered-normal work activities		$\chi^2=108.78$, $p<0.001$
No pain	19.2	
Mild pain	18.1	
Mod-severe pain	63.9	
Pain interfered-relations with others		$\chi^2=134.94$, $p<0.001$
No pain	22.4	
Mild pain	28.7	
Mod-severe pain	77.0	
Pain interfered-sleep		$\chi^2=99.43$, $p<0.001$
No pain	20.6	
Mild pain	25.9	
Mod-severe pain	65.1	
Pain interfered-enjoyment of life		$\chi^2=152.26$, $p<0.001$
No pain	15.3	
Mild pain	25.8	
Mod-severe pain	71.6	

Table 4. Final Logistic Regression Models

	Psychological distress		Talked to treatment provider about emotional problems	
	$R^2=0.52$		$R^2=0.19$	
	$N=495^*$		$N=226$	
Independent variables	Odds ratio	95% CI	Odds ratio	95% CI
Mild current pain	0.54	0.254, 1.14	1.30	0.471, 3.57
Mod-severe current pain	0.91	0.438, 1.89	0.82	0.363, 1.84
Patient age	1.00	0.986, 1.02	1.01	0.984, 1.04
Ethnicity				
White	-	-	-	-
Black	0.92	0.502, 1.69	0.58	0.238, 1.43
Hispanic	0.78	0.388, 1.56	1.53	0.641, 3.64
Other	0.72	0.262, 2.01	2.67	0.763, 9.34
Education >high school	0.50	0.291, 0.86 ^a	0.76	0.376, 1.53
Prior depression	4.99	3.00, 8.28 ^b	2.64	1.293, 5.40 ^c
Mod-severe interference relations others	3.06	1.69, 5.53 ^b	-	-
Mod-severe interference enjoyment of life	3.33	1.85, 5.98 ^b	-	-
Pain multiple places	1.36	1.02, 1.80 ^c	-	-
Pain in arms, legs, joints	2.36	1.26, 4.43 ^d	-	-
Mild interference with sleep	-	-	3.08	1.042, 9.10 ^f
Headache pain	-	-	2.39	1.226, 4.67 ^g

^a $p=0.013$; ^b $p<0.000$; ^c $p=0.036$; ^d $p=0.001$; ^e $p=0.008$; ^f $p=0.042$; ^g $p=0.011$

*N is less than 528 due to missing data for some independent variables

more likely than those without pain to have psychological distress ($p<0.001$ in all 15 replications). The amount of variation explained ranged from 0.16%-0.22% across the 15 replications. In contrast, the final model explained 52% of the variation (C-index of 0.878 compared to the reduced model C-index of 0.720). In the final model, severe current pain was no longer significantly associated with distress. Distress was significantly more likely in patients with less than a high school education, those with medical chart indications of prior depression, those with moderate to severe interference in relations with others and in enjoyment of life, those with pain in multiple locations, and those who reported problems with pain in arms, legs, or joints in the prior month.

Among patients with psychological distress, talking with the doctor or treatment provider was not significantly related to any of the pain indicators. Patients definitely not willing to deal with emotional problems through counseling were significantly more likely to be African American ($\chi^2=8.17$, $p=0.043$) and significantly less likely to discuss emotional problems with their provider that day ($\chi^2=9.11$, $p=0.028$). Among those with distress who reported no pain, 23% were unwilling to deal with emotional problems through counseling compared to 18% of those with distress who reported some pain.

The final model (Table 4) based on the series of stepwise regressions found that among patients with psychological distress, those who talked to their provider about emotional problems that day were more likely to have a medical record

indication of prior depression; to have mild, compared to no or moderate to severe interference with sleep; and to report problems with headaches. The amount of variation explained by the model was 0.186 (C-index of 0.720 compared to the reduced model C-index of 0.616). None of the provider factors were related to talking to the provider about emotional problems.

DISCUSSION

Given that many health-care organizations mandate routine pain screening, the initial screening period may be a good opportunity to probe for symptoms of anxiety and depression in those patients who report moderate to severe pain. While all pain indicators we evaluated were related to increased distress, multivariate analyses suggest that moderate to severe pain interference with relations with others and enjoyment of life may be even more important than pain severity in identifying persons at high risk for psychological distress. Pain in multiple locations and pain that occurs in arms, legs or joints, both of which may reflect chronic pain, are also indicators of high risk for psychological distress. A substantial portion of the variation in distress (52%) was explained by these pain factors and prior depression.

In contrast, neither pain severity nor pain interference with life or relations with others were related to provider detection of distress. The probability of detection rose among distressed patients who reported mild pain interference with sleep and headaches in the prior month. This suggests that providers are responding to somatic complaints that are pain symptoms, but may also be stress related. These results are consistent with other research that shows that patients with depression are more likely to report physical symptoms only rather than depressive symptoms.²³ However, only a small amount of the variance in detection (19%) was explained by patient pain factors, suggesting that other non-measured variables may explain provider detection of depression and anxiety.

None of the provider factors were related to provider detection of distress. This does not appear to be related to lack of power as with 80% power it is possible to detect an OR of 2.31 and statistical significance was achieved in these analyses. Other research suggests that primary care providers who face competing demands establish priorities in patients with multiple problems and often address physical problems rather than depression treatment.²⁴ This may explain the results in this study.

There are a number of limitations to this study. The data are based on a VA sample and might not be generalizable to other populations. On the other hand, the VA has nearly a decade of experience with required pain and depression/PTSD screening. So the provider performance we detected may represent a best-case scenario. We do not have data, however, to characterize providers who refused to participate in the study. The item "talking to the doctor about emotional problems" is a crude indicator of detection. The data are self-reports of symptoms and not based on formal diagnoses. Thus, the estimate of "probable" psychological distress may be overstated and the estimate of non-detection of depression and anxiety may be understated. However, the measures that were used to construct psychological distress show high sensitivity for major depression (83%) and any anxiety disorder (86%).^{17,18}

In addition, symptoms of depression and anxiety that do not meet thresholds for diagnoses may be important to address since they may place patients at high risk for development of future disorder. Finally, sampling of providers prior to patient encounters may have conditioned the provider's subsequent interaction with patients. However, we approached providers to fill out the attitudinal questions many weeks prior to surveying the patients, and providers were not informed of the day that their patients were interviewed.

In spite of these limitations, results suggest that there is a need for targeted depression and anxiety screening among those patients with moderate-to-severe pain. Additional pain factors that could be used to identify the need to screen for these disorders include the presence of multiple pain locations, pain in arms, legs or joints, and pain interference in enjoyment of life and relationships. In a system like the VA with an electronic medical record, prior diagnoses can also be incorporated easily to improve the screening algorithm. Early identification and treatment of co-occurring depression and anxiety may facilitate the patient's capacity to adapt to severe pain and result in a more favorable treatment response. It could also ultimately reduce overall costs to the health-care system.

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