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Does comorbid chronic pain affect posttraumatic stress disorder diagnosis and treatment? Outcomes of posttraumatic stress disorder screening in Department of Veterans Affairs primary care

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Abstract—Because posttraumatic stress disorder (PTSD) is both prevalent and underrecognized, routine primary care-based screening for PTSD has been implemented across the Veterans Health Administration. PTSD is frequently complicated by the presence of comorbid chronic pain, and patients with both conditions have increased symptom severity and poorer prognosis. Our objective was to determine whether the presence of pain affects diagnosis and treatment of PTSD among Department of Veterans Affairs (VA) patients who have a positive PTSD screening test. This retrospective cohort study used clinical and administrative data from six Midwestern VA medical centers. We identified 4,244 VA primary care patients with a positive PTSD screen and compared outcomes for those with and without a coexisting pain diagnosis. Outcomes were three clinically appropriate responses to positive PTSD screening: (1) mental health visit, (2) PTSD diagnosis, and (3) new selective serotonin reuptake inhibitor (SSRI) prescription. We found that patients with coexisting pain had a lower rate of mental health visits than those without pain (hazard ratio: 0.889, 95% confidence interval: 0.821–0.962). There were no significant differences in the rate of PTSD diagnosis or new SSRI prescription between patients with and without coexisting pain.

Key words: comorbidity, health services research, healthcare utilization, mental health, pain, posttraumatic stress disorder, primary care, screening, Veterans, Veterans health.

INTRODUCTION

Posttraumatic stress disorder (PTSD) is both prevalent and underrecognized in primary care. Prior to operations in Iraq and Afghanistan, the point prevalence of PTSD among Department of Veterans Affairs (VA) primary care patients was estimated at 11.5 percent and the diagnosis was recognized by the primary care provider in less than 50 percent of cases [1]. Routine screening with the 4-item Primary Care PTSD Screen (PC-PTSD) has

Abbreviations: CI = confidence interval, ICD-9 = International Classification of Diseases-9th Revision, PC-MHI = Primary Care-Mental Health Integration, PC-PTSD = Primary Care PTSD Screen, PTSD = posttraumatic stress disorder, SSRI = selective serotonin reuptake inhibitor, VA = Department of Veterans Affairs.

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been implemented within the VA system to facilitate early recognition of PTSD [2].

PTSD is frequently complicated by the presence of comorbid chronic pain. Studies of Veterans in all eras since Vietnam have yielded high rates of comorbidity between the two conditions [3–5]. Patients with comorbid PTSD and pain have worse symptom severity, worse prognosis and treatment outcomes, greater levels of disability, worse quality of life, greater levels of psychological distress, and worse maladaptive thinking and coping patterns [6–12]. Theoretical models have postulated underlying vulnerabilities that predispose the development of both chronic pain and PTSD [13] as well as multiple ways in which the two conditions exacerbate and maintain one another [14].

Previous research has shown that co-occurrence of depression and pain is associated with a decreased likelihood that depression will be appropriately diagnosed and treated [15]. This may occur because patients or clinicians prefer to focus on managing physical symptoms [16]. Whether similar effects occur in comorbid PTSD and pain is unknown, but it is plausible given the commonalities between chronic pain and PTSD of avoidant coping style, reduced activity, and social withdrawal that may affect healthcare utilization [14]. Depression management has been the focus of considerable attention in primary care and is now principally managed by generalist providers in primary care. PTSD differs in that it has received less attention in primary care and the most effective evidence-based therapies for PTSD are typically delivered in mental health settings; however, initial diagnosis and treatment or referral usually occur in primary care. Following a positive screen and further evaluation of symptoms, current VA guidelines advise primary care providers to manage PTSD by initiating pharmacotherapy (primarily selective serotonin reuptake inhibitors [SSRIs]) and/or referring to psychotherapy [17].

Our objective was to determine whether coexisting pain affects diagnosis and treatment of PTSD among VA patients who have a positive PTSD screening test in primary care. Based on previous literature on chronic pain and comorbid depression in primary care patients [16], we hypothesized that the presence of pain would predict longer delays in PTSD evaluation and treatment outcomes following positive PTSD screenings in primary care. We evaluated time to mental health visit, time to PTSD diagnosis, and time to new SSRI prescription as our outcomes.

METHODS

This retrospective cohort study included patients receiving care within Veterans Integrated Service Network 11, the VA regional healthcare network serving Michigan, Indiana, and Illinois. Clinical and administrative data were extracted from local databases of six VA medical centers. We included patients who had a positive PTSD screening test between January 1, 2001, and January 1, 2007, and had a primary care visit within 30 days after the positive screening. We excluded patients from this analysis if they had a preexisting PTSD diagnosis (International Classification of Diseases-9th Revision [ICD-9] 309.81) or if they had no primary care visit within 30 days of the positive screening test. Outcomes that occurred up to January 1, 2008, were analyzed.

Measures

VA clinical sites included in this study used the PC-PTSD to screen for PTSD in primary care clinics. The PC-PTSD was developed and validated among Veterans seen in outpatient VA primary care clinics and implemented nationally. A score of 3 has been determined to be the optimally efficient cutoff and is used by VA as the cutoff for a positive screen [2,18]; accordingly, we considered a score of ≥3 to be a positive screen for this study. A positive screen on the PC-PTSD has a positive predictive value of 0.65 and a negative predictive value of 0.92 for clinical PTSD diagnosis [2].

The primary independent variable was coexisting pain, defined as an ICD-9 diagnostic code for a pain diagnosis in the year prior to the positive PTSD screen. We used ICD-9 codes for headache (346, 307.81, 784.0, 62.72, 339), back pain (720–724), arthritis and joint pain (710–719, 725–739.9), and nonspecific pain conditions (780.96, 307.8, 307.89, 338), which account for the vast majority of chronic pain diagnoses among Veterans [19–22]. We also used ICD-9 codes to determine the presence of depression (296.2, 296.3, 311), alcohol use disorder (303.9, 305.0), and drug use disorder (304, 305.2–305.9) in the year prior to the positive PTSD screen.

Outcomes

We examined outcomes representing potential clinical responses to positive PTSD screening. The screening outcomes examined were (1) time to mental health visit, (2) time to PTSD diagnosis, and (3) time to new SSRI prescription. Mental health visits included those to both

general mental health and substance use disorder clinics. PTSD diagnosis was defined by an ICD-9 code of 309.81. SSRI use was evaluated by review of VA outpatient pharmacy prescription dispensing data, which included medication names and dates for all prescriptions filled.

Statistical Analysis

We compared characteristics of patients with and without coexisting pain using chi-square and *t*-tests for categorical and continuous variables, respectively. Survival analyses of time from first positive PTSD screening to time of mental health visit, time of PTSD diagnosis, and time of new SSRI prescription were conducted using Kaplan-Meier estimates for determining median time to event and event rates at specific times. Analyses of time to SSRI prescriptions excluded participants with an SSRI prescription in the prior year. We then used Cox's proportional hazards regression to evaluate the association between coexisting pain and PTSD screening outcomes over time; separate Cox models were used to determine the effect of comorbid pain on each outcome. Cox proportional hazards assume hazard ratios of effects are constant over time. Each model included the following covariates: age, sex, mental health visit in the previous year, depression, alcohol disorder, drug disorder, and medical comorbidity as derived from the Romano adaptation of the Charlson index [23–24]. Interactions between site and pain were not significant, so site-specific analyses were not conducted. Analyses were conducted using SAS 9.2 (SAS Institute Inc; Cary, North Carolina).

RESULTS

After exclusion of 1,361 patients with a prior PTSD diagnosis and 479 who had no primary care visit within 30 days of PTSD screening, the cohort included 4,244 patients with a positive PTSD screen. The majority of included patients had a primary care visit the same day as their PTSD screening test (n = 4,028, 94.9%). The mean age was 50.4, and 91.9 percent of patients were male. Race data were missing on 56.1 percent of cohort members. Half of the cohort (49.6%) had a coexisting pain diagnosis, and 38.6 percent had a current analgesic prescription (**Table 1**). Patients with a pain diagnosis were slightly younger (48.8 vs 52.0 yr old, $p < 0.001$) and more often had depression (33.4% vs 29.4%, $p = 0.005$) than those without pain (**Table 2**).

Table 1.
Baseline characteristics of patients who screened positive for posttraumatic stress disorder (N = 4,244).

Characteristic	Mean ± SD or *n* (%)
Age (yr)	50.4 ± 15.9
Male	3,900 (91.9)
Race	
White	1,636 (38.5)
Black	228 (5.4)
Unknown	2,380 (56.1)
Depression Diagnosis	1,331 (31.4)
Alcohol Disorder Diagnosis	415 (9.8)
Drug Disorder Diagnosis	178 (4.2)
Mental Health Visit in Past Year	907 (21.4)
Comorbidity (Charlson Index score)	0.64 ± 1.01
Pain Diagnosis*	2,104 (49.6)
Back	971 (22.9)
Joint or Limb	1,385 (32.6)
Headache	238 (5.6)
Current Pain Medication	1,638 (38.6)
Pain Score† (≥4)	1,689 (39.8)

*Some participants recorded >1 pain location.
†Self-rated between 0 and 10 by patients.
SD = standard deviation.

Mental Health Visit

Overall, the median time to a mental health visit was 5.7 mo (95% confidence interval [CI]: 4.6–6.9 mo) and 56.4 percent had a mental health visit in the year after the positive PTSD screening result. **Table 3** shows the number of patients with a mental health visit at 3, 6, 9, and 12 mo after the positive PTSD screening test. Patients with coexisting pain had a statistically significant lower rate of mental health visits than those without pain (**Table 4**); however, this difference was small. In the multivariate model, patients with pain had a lower rate of mental health visits (HR: 0.889, 95% CI: 0.821–0.962) than those without pain.

Posttraumatic Stress Disorder Diagnosis

During the study follow-up period, 1,280 (30%) patients who had a positive PTSD screen received a PTSD diagnosis. **Table 3** shows the number of patients who received a PTSD diagnosis at 3, 6, 9, and 12 mo after the positive PTSD screening test. For those who received a PTSD diagnosis, the median time to diagnosis was 12.7 mo. Patients with and without coexisting pain did not significantly differ in PTSD diagnosis rates (HR: 0.968, 95% CI: 0.866–1.082).

Table 2.
Unadjusted comparison of patients who screened positive for posttraumatic stress disorder with and without pain. Data presented as mean ± standard deviation or *n* (%).

Characteristic	No Pain (*n* = 2,140)	Pain (*n* = 2,104)	*p*-Value*
Age (yr)	52.0 ± 15.9	48.8 ± 15.6	<0.001
Male	1,984 (92.7)	1,916 (91.1)	0.05
Depression Diagnosis	629 (29.4)	702 (33.4)	0.005
Alcohol Disorder Diagnosis	204 (9.5)	211 (10.0)	0.59
Drug Disorder Diagnosis	83 (3.9)	95 (4.5)	0.30
Mental Health Visit in Past Year	443 (20.7)	464 (22.1)	0.28
Charlson Comorbidity Index Score†			<0.001
0	1,205 (56.3)	1,361 (64.7)	
1	574 (26.8)	452 (21.5)	
≥2	361 (16.9)	291 (13.8)	

*Unadjusted comparison between those with and without pain.
†Categorized for ease of interpretation. Range = 0–8. *p*-Value is for continuous score.

Table 3.
Outcomes of screening at 3, 6, 9, and 12 mo after positive posttraumatic stress disorder (PTSD) screen, *n* (%).

Time Point (mo)	Mental Health Visit*	PTSD Diagnosis	New SSRI Prescription
3	1,842 (44.7)	929 (22.3)	667 (0.2)
6	2,063 (50.3)	1,017 (24.5)	784 (0.2)
9	2,194 (53.8)	1,074 (26.1)	875 (0.3)
12	2,283 (56.4)	1,132 (27.7)	938 (0.3)

*Kaplan-Meier survival rates.
SSRI = selective serotonin reuptake inhibitor.

Table 4.
Relationship between pain comorbidity and outcomes of screening.

Outcome	Pain vs No Pain, HR (95% CI)	*p*-Value
Mental Health Visit	0.889 (0.821–0.962)	0.004
PTSD Diagnosis	0.968 (0.866–1.082)	0.57
New SSRI Prescription	0.996 (0.885–1.122)	0.95

Note: Survival analysis adjusted for age, sex, prior mental health visit, depression, alcohol disorder, drug disorder, and Charlson comorbidity index score.
CI = confidence interval, HR = hazard ratio, PTSD = posttraumatic stress disorder, SSRI = selective serotonin reuptake inhibitor.

We subsequently examined the relationship between mental health visits and PTSD diagnosis. Patients who had a mental health visit after their positive PTSD screen were more likely than those without a mental health visit to receive a diagnosis of PTSD (HR: 1.388, 95% CI: 1.232–1.563). Among those who received a PTSD diagnosis, 780 (59.4%) were diagnosed by a mental health clinician.

Selective Serotonin Reuptake Inhibitor Prescription

Approximately 17 percent of participants (*n* = 720) had received an SSRI prescription within 12 mo preceding their PTSD screening and were thus excluded from the SSRI survival analysis. **Table 3** demonstrates the number of patients with a new SSRI prescription at 3, 6, 9, and 12 mo following the positive PTSD screen. There was no significant difference in time to SSRI prescription between the positive and negative PTSD screening groups (**Table 4**).

DISCUSSION

Contrary to our hypotheses, coexisting pain did not substantially affect follow-up of positive PTSD screening. Comorbid pain was not associated with significant

differences in time to PTSD diagnosis or time to SSRI prescription. Although patients with pain demonstrated longer times between a positive PTSD screen and a mental health visit, the difference was small.

Nearly half of the sample did not visit a mental health provider following the positive PTSD screening in primary care, 70 percent were not diagnosed with PTSD during the follow-up period, and 83 percent did not receive SSRI medication. Our results are consistent with data from previous research but show even lower rates of postscreening diagnosis and pharmacotherapy. A recent study of primary care screening outcomes demonstrated that only about half of patients with positive PTSD screens (56%) progressed to some form of treatment (either medication only, psychotherapy only, or a combination of the two) [25]. In a similar study, only 39 percent of patients attended a mental health visit and 48 percent received antidepressant medication following a positive PTSD screening test [26].

We do not know the optimal rates of these follow-up outcomes; presumably, some proportion of positive screening tests was determined by the primary care provider to represent false positives that did not require follow-up assessment or treatment outside primary care. In other cases, patient preference or barriers to mental health care may have affected outcomes. Prior literature indicates that many patients do not acknowledge their PTSD, are not aware that it can be treated, do not want treatment for it, or perceive a stigma related to seeking and receiving treatment [27–29].

A large majority of the sample was not diagnosed with PTSD following a positive screen in primary care; however, we do not know how many patients were evaluated and found not to meet diagnostic criteria for PTSD or how many patients were not evaluated at all. Previous literature examining PTSD in primary care found that providers identified and documented PTSD in only 11 percent of primary care patients with the diagnosis following positive PTSD screening [30]. In a separate study, primary care providers were more likely to label any evident distress as depression rather than the PTSD identified by research assessment instruments [31].

Although prior studies have found that comorbid pain is associated with a decreased likelihood that depression will be appropriately diagnosed and treated [13], we did not find a similar overall effect of comorbid pain on PTSD screening outcomes. This may be due to differences in the usual process of care for depression, which is most often managed in primary care, versus PTSD, which is usually managed in mental health clinics. Perhaps PTSD remains difficult to recognize and address in primary care regardless of comorbid medical conditions despite the guidance of PTSD screening tools.

The last year of this study overlapped with the 2007 start of the national implementation of the VA Primary Care-Mental Health Integration (PC-MHI) program [32]. This initiative systematically installed colocated and collaborative mental health providers within primary care clinics across VA. This program's effect on outcomes of positive PTSD screening in primary care is not yet fully known. One study demonstrated the benefit of PC-MHI with improved consult completion rates and higher PTSD diagnosis rates as compared with referrals from specialty care [33]; however, there were no differences by referral source in follow-up visits in the PTSD clinic. The current study is limited by the age of the data and therefore does not account for the ongoing efforts across VA to improve PTSD care; we cannot infer whether PTSD screening outcomes have changed since the data were collected. Future research should compare postscreening PTSD evaluation and treatment rates from before versus after the implementation of mental health programs in primary care to see what differences may emerge.

This study has additional limitations. First, as mentioned previously, we do not know the true rate of PTSD in the population and therefore are unable to evaluate appropriateness of follow-up among patients with and without pain. Second, diagnostic codes for pain are imprecise and noninformative regarding pain severity, pain control, and other pain outcomes, which is an inherent limitation of administrative data sets. Third, these administrative data did not provide the reasons for which SSRIs were prescribed; it is plausible that some patients were started on an SSRI for depression rather than PTSD. It also may be the case that mental health visits were initiated for reasons other than PTSD. Finally, although this study included diverse Midwestern VA sites, findings may not generalize to other VA and non-VA settings.

Despite its limitations, this study makes an important contribution to the literature as the first to examine the effect of comorbid pain on the diagnosis and treatment of PTSD following a positive PTSD screening test in VA primary care. A recent systematic review and report on PTSD screening in primary care indicated a need for studies "examining the impact of mental health screening on the primary care encounter within the VA system" [34,

p. 4]. Further research is warranted to explore in depth the likely multifaceted explanations behind these findings. For example, it would be important to understand whether age or era of service affects PTSD screening outcomes; newly returning Operation Iraqi Freedom/Operation Enduring Freedom/Operation New Dawn Veterans are typically younger than our sample's average age of 50.4 yr and have often been exposed to more combat experiences that are traumatic and injurious and thus may demonstrate different patterns of healthcare utilization related to symptoms of PTSD and chronic pain [35].

CONCLUSIONS

We examined outcomes of positive PTSD screening in VA primary care among Veterans with and without pain diagnoses. Patients with coexisting pain did not differ in time by PTSD diagnosis or new SSRI prescription and had longer delays to mental health visits than those without pain. Given that there are effective psychological treatments for chronic pain (i.e., cognitive behavioral therapy [36], acceptance and commitment therapy [37]) and PTSD (i.e., prolonged exposure [38], cognitive processing therapy [39]), it is crucial to ensure that Veterans living with both conditions are offered these interventions. Across the board, regardless of pain comorbidity, diagnosis and treatment rates following positive PTSD screenings were low. This gap following positive PTSD screens in primary care represents an area of potential promise for implementation strategies to identify and address the specific barriers to postscreening diagnosis and treatment.

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Study concept and design: E. E. Krebs.
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Additional Contributions: Ms. Hoen is now with the Earle A. Chiles Research Institute, Portland, Oregon.
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