

Same-Day Integrated Mental Health Care and PTSD Diagnosis and Treatment Among VHA Primary Care Patients With Positive PTSD Screens

Kipling M. Bohnert, Ph.D., Rebecca K. Sripada, Ph.D., Jennifer Mach, M.D., M.P.H., John F. McCarthy, Ph.D.

Objective: The study examined whether same-day integrated mental health services are associated with increased diagnosis and treatment initiation among primary care patients with positive posttraumatic stress disorder (PTSD) screens.

Methods: Data were from a national sample of Veterans Health Administration (VHA) primary care patients with a positive PTSD screen (N=21,427). Patients were assessed for PTSD diagnosis and treatment initiation on the screening day and ≤ 7 days, ≤ 12 weeks, ≤ 6 months, and ≤ 1 year after screening positive. The service setting on screening day was categorized as primary care only, same-day primary care–mental health integration (PC-MHI), or same-day specialty mental health care. Multivariable generalized estimating equations logistic regression was used to estimate associations between category of screening day services and diagnosis and treatment initiation, with adjustment for demographic characteristics, prior psychiatric diagnoses, prior VHA service utilization, and PTSD screen score.

Results: Of the 21,427 patients with positive PTSD screens, 10,809 (50.4%) received a diagnosis within one year of screening positive. Same-day PC-MHI services were associated with greater odds of PTSD diagnosis, both on the same day as (odds ratio [OR]=2.23) and one year (OR=1.67) after screening positive compared with primary care–only services ($p < .001$). Among those who received a diagnosis on the same day as their positive screen, same-day PC-MHI services were associated with increased odds of initiating PTSD treatment (OR=3.39) within 12 weeks of diagnosis, compared with primary care only ($p < .001$).

Conclusions: Same-day integrated mental health services may help facilitate PTSD diagnosis and treatment initiation after a positive screen.

Psychiatric Services 2016; 67:94–100; doi: 10.1176/appi.ps.201500035

To enhance the recognition of posttraumatic stress disorder (PTSD) among its patients, the Veterans Health Administration (VHA) mandates behavioral health screening for the disorder (1,2). Such screening generally occurs within the context of primary care via the Primary Care PTSD Screen (PC-PTSD) (3). When screens are positive, timely follow-up diagnostic assessment and appropriate treatment for those diagnosed are critical elements of high-quality mental health services delivery. In particular, prompt diagnoses may foster recognition of service needs among those with the disorder and promote initiation and engagement in treatment (4–6). Nonetheless, few studies have examined factors associated with diagnosis and treatment among VHA patients who screen positive for PTSD.

Collaborative care services within the PC setting may be especially relevant for diagnosis and treatment initiation among patients who present with PTSD symptoms (7); however, much of the prior research in this area has focused on depression and depression-related outcomes (8,9). Within VHA, the mandated, systemwide implementation of integrated

care, commonly referred to as primary care–mental health integration (PC-MHI), began in fiscal year (FY) 2008. As previously described in greater detail, the PC-MHI program includes colocation of collaborative mental health providers in primary care and disorder-specific care management for individuals with psychiatric conditions (10,11). PC-MHI services may be delivered on the same day that initial need is detected and may include prescribing appropriate medications, delivering psychotherapy, and managing referrals to more specialized mental health clinics, including those treating PTSD.

The implementation of PC-MHI in VHA provides an opportunity to better understand the potential salutary impact of integrated care on mental health services delivery for patients with PTSD. For example, a prior facility-level evaluation found significantly greater increases in psychiatric diagnoses among facilities with documented PC-MHI activity compared with facilities without such activity (12); however, a subsequent report found no evidence of differential rates of treatment initiation at specialty mental health

clinics between facilities with and without PC-MHI (13). Other single-site VHA analyses also lend support for the finding of a potentially positive role of PC-MHI services for patients with PTSD. For instance, Brawer and colleagues (14) found increased completion of PTSD clinic consultations among patients referred by PC-MHI team members compared with those referred by primary care providers.

Despite these promising initial findings, to our knowledge no systemwide evaluation of the potential impact of PC-MHI on PTSD diagnosis and treatment initiation after screening has been conducted in VHA. Therefore, with a national sample of VHA patients who screened positive for PTSD this study compared rates of diagnosis and treatment initiation according to patients' service setting on the screening day, namely, primary care only, PC-MHI, or specialty mental health clinics located outside of primary care. Using multivariable modeling, we estimated the association between setting of screening-day services and same-day PTSD diagnosis, as well as PTSD diagnosis that occurred within one year of screening. We also modeled the relationship between service setting on screening day and initiation of PTSD treatment, including psychotherapy, PTSD clinic visit, and antidepressant medication prescription receipt, within 12 weeks of screening. On the basis of prior studies, we hypothesized that receipt of same-day PC-MHI would be associated with increased odds of PTSD diagnosis and treatment initiation compared with primary care only.

METHODS

Sample and Data

Study data were a 30% random sample of all VHA primary care patients in FY 2010. The sample included all patients who were in the 30% random sample, who had a positive PTSD screen recorded in FY 2010 (specifically, a score of ≥ 3 on the PC-PTSD), who received primary care services on the screening date, who did not have a recorded PTSD diagnosis or PC-MHI or specialty mental health services in the 12 months before the screening, and who were at least 18 years old, for a total of 21,427 veterans. PTSD screening assessments were from the VHA Corporate Data Warehouse (CDW) and were matched to patient administrative health records from VHA National Patient Care Database (NPCD) and pharmacy records from VHA Decision Support Services. The VHA Ann Arbor Healthcare System Institutional Review Board approved this study.

Measures

The primary outcomes of interest were PTSD diagnosis and PTSD treatment initiation. PTSD diagnosis was identified via an *ICD-9-CM* diagnosis code of 309.81 in NPCD records. PTSD treatment initiation outcomes included the following: receipt of psychotherapy, PTSD clinic visit, prescription for an antidepressant medication, and any treatment initiation

(any combination of psychotherapy, PTSD clinic visit, or antidepressant prescription). Receipt of psychotherapy was identified by Current Procedural Terminology codes 90804–90815, 90845, 90847, 90853, and 90857 in any field of the outpatient or inpatient NPCD. PTSD clinic visit was assessed via clinic stop code in the NPCD. Antidepressant medications included citalopram, fluoxetine, paroxetine, sertraline, venlafaxine, escitalopram, fluvoxamine, and desvenlafaxine. Patients were assessed for PTSD diagnosis and treatment initiation outcomes on the screening day and ≤ 7 days, ≤ 12 weeks, ≤ 6 months, and ≤ 1 year after positive screen.

The focal predictor was setting of services on the date of PTSD screening, which was assessed with established identifiers in the outpatient encounters data set of the NPCD. Service setting on the screening date was categorized as follows: primary care only, same-day PC-MHI, and same-day specialty mental health care at a specialty mental health clinic.

The following covariates were also included in multivariable analyses: demographic characteristics (age group, sex, race, Hispanic ethnicity, and marital status), service-connected disability status of $\geq 50\%$, any prior psychiatric diagnosis other than PTSD, any prior VHA outpatient use, and positive PC-PTSD score (a score of 3 or 4) (3). Covariates were assessed from the NPCD, with the exception of the PC-PTSD screen scores, which were assessed from CDW data.

Statistical Analysis

First, basic frequencies and percentages of demographic and clinical variables were calculated for the sample overall and by category of services received on the date of PTSD screening. Second, for each category of services, cumulative percentages of PTSD diagnoses and treatment initiation outcomes were computed according to the specified time intervals (≤ 1 day, ≤ 7 days, ≤ 12 weeks, ≤ 6 months, and ≤ 1 year of screening positive). Third, multivariable generalized estimating equations (GEE) logistic regression models were fit to estimate associations between category of screening day services and the odds of PTSD diagnosis on the screening day and ≤ 1 year of screening positive among the entire sample, and the odds of PTSD treatment initiation ≤ 12 weeks of screening positive among patients who also received a diagnosis on the date of their positive screen (15). GEE modeling was used to take into account the clustered nature of the data, with patients nested within VHA facilities. We specified exchangeable working correlation structures and used robust variance estimators that produce valid estimates of standard errors even when the correlation structures are incorrectly specified. All GEE models also adjusted for patient demographic characteristics, service-connected disability status, prior psychiatric diagnosis, prior VHA outpatient use, and PC-PTSD score. Analyses were performed with SAS 9.2.

RESULTS

Table 1 provides demographic and clinical information for the 21,427 patients in the sample overall with positive PTSD

TABLE 1. Characteristics of 21,427 primary care patients with positive PTSD screens, by service setting on screening day, fiscal year 2010

Characteristic	Overall (N=21,427)		Primary care (N=18,157)		Same-day care			
					PC-MHI (N=1,507) ^a		Specialty (N=1,763) ^b	
	N	%	N	%	N	%	N	%
Age group ^c								
≤44	8,155	38.1	6,465	35.6	657	43.6	1,033	58.6
45–64	10,717	50.0	9,322	51.3	752	49.9	643	36.5
≥65	2,555	11.9	2,370	13.1	98	6.5	87	4.9
Sex ^c								
Female	1,398	6.5	1,151	6.3	107	7.1	140	7.9
Male	20,029	93.5	17,006	93.7	1,400	92.9	1,623	92.1
Race								
White	13,573	63.4	11,453	63.1	964	64.0	1,156	65.6
Black	3,773	17.6	3,245	17.9	236	15.7	292	16.6
Other	770	3.6	647	3.6	59	3.9	64	3.6
Unknown	3,311	15.4	2,812	15.5	248	16.5	251	14.2
Hispanic ethnicity ^c								
Yes	1,037	4.8	892	4.9	53	3.5	92	5.2
No	20,390	95.2	17,265	95.1	1,454	96.5	1,671	94.8
Marital status ^c								
Married	11,506	53.7	9,888	54.5	762	50.6	856	48.6
Not married	5,239	24.5	4,497	24.8	377	25.0	365	20.7
Never married	4,353	20.3	3,506	19.3	348	23.1	499	28.3
Unknown	329	1.5	266	1.5	20	1.3	43	2.4
Service-connected disability benefit ≥50% ^c								
Yes	5,036	23.5	4,554	25.1	220	14.6	262	14.9
No	16,391	76.5	13,603	74.9	1,287	85.4	1,501	85.1
Any prior psychiatric diagnosis ^c								
Yes	1,807	8.4	1,612	8.9	93	6.2	102	5.8
No	19,620	91.6	16,545	91.1	1,414	93.8	1,661	94.2
Any prior VHA outpatient service use ^{c,d}								
Yes	12,794	59.7	11,231	61.8	800	53.1	763	43.3
No	8,633	40.3	6,926	38.2	707	46.9	1,000	56.7
PC-PTSD score ^{c,e}								
3	8,391	39.2	7,237	39.9	551	36.6	603	34.2
4	13,036	60.8	10,920	60.1	956	63.4	1,160	65.8

^a Mental health care integrated with primary care^b Specialty mental health care^c Significant difference between three service categories ($p < .05$) for all variables except race^d VHA, Veterans Health Administration^e PC-PTSD, Primary Care Posttraumatic Stress Disorder screen. A score of 3 or higher is a positive screen.

screens and by setting of services received on the PTSD screening date. As shown in the table, the three categories of services had significantly different distributions for all of the characteristics except race (all $p < .05$).

In Table 2, the cumulative incidence of PTSD-related diagnoses and treatment initiation, which included psychotherapy, PTSD clinic visit, antidepressant prescription, and any of the three categories of treatment, are shown at specified time intervals over one year for each of the three categories of screening-day services. Overall, of the 21,427 patients, 10,809 (50.4%) received a diagnosis within one year of screening positive. Compared with patients who received

only primary care services, a greater percentage of patients who received PC-MHI services on the date of their positive PTSD screen were also diagnosed as having PTSD on that same day (41.7% versus 24.8%). An estimated 47.5% of those who also received specialty mental health services on their PTSD screening date received a same-day PTSD diagnosis. Moreover, lower rates of PTSD diagnosis were observed at every specified time interval for the primary care-only group. At the end of one year, the cumulative incidence of PTSD diagnosis had increased in all groups; however, the lowest rate of PTSD diagnosis was observed for patients seen in standard primary care (47.9%). Similar patterns were also noted with respect to PTSD treatment initiation outcomes (Table 2). For example, .5%, 40.0%, and 33.9% initiated psychotherapy on the same day as their PTSD screening among those who received primary care, PC-MHI care, and specialty mental health care, respectively.

Results from the multivariable GEE logistic regression models predicting same-day and one-year PTSD diagnoses are presented in Table 3. As shown in the table, patients who received same-day PC-MHI services had significantly greater odds of receiving a PTSD diagnosis on the same day as their positive PTSD screen compared with patients who received solely primary care (adjusted odds ratio [AOR]=2.23). The AOR associated with same-day specialty mental health services was similar (AOR=2.56) and was not significantly different from the PC-MHI estimate ($p > .05$). Somewhat lower estimates were obtained from the model estimating one-year PTSD diagnosis (for same-day PC-MHI, AOR=1.67; for specialty mental health, AOR=2.03; the two estimates differed significantly, $p < .05$). Although not the primary interest, other findings with the models are noteworthy. With respect to the same-day diagnosis

model, patients in the two older age groups, black patients, Hispanic patients, individuals who were not married, patients with a prior psychiatric diagnosis other than PTSD, and individuals who had used VHA outpatient services had lower odds of diagnosis than their respective comparison groups. Males, patients with service-connected disability of 50% or greater, and patients with a PC-PTSD score of 4 had greater odds of diagnosis compared with their respective comparison groups. The one-year model had similar findings, with the following exceptions: Hispanic ethnicity was not significantly associated with diagnosis; patients whose race was unknown and individuals who

TABLE 2. Cumulative incidence of PTSD diagnosis and treatment of 21,427 primary care patients with positive PTSD screens, by location and timing of services

Service and treatment ^a	Time from positive PTSD screen to treatment									
	Same day		≤7 days		≤12 weeks		≤6 months		≤1 year	
	N	%	N	%	N	%	N	%	N	%
PTSD diagnosis										
Primary care	4,500	24.8	4,918	27.1	7,200	39.7	7,912	43.6	8,703	47.9
Same-day PC-MHI	628	41.7	655	43.5	812	53.9	855	56.7	908	60.3
Same-day specialty mental health care	838	47.5	888	50.4	1,096	62.2	1,149	65.2	1,198	68.0
Psychotherapy initiation										
Primary care	92	.5	539	3.0	4,735	26.1	6,181	34.0	7,391	40.7
Same-day PC-MHI	602	40.0	655	43.5	997	66.2	1,075	71.3	1,144	75.9
Same-day specialty mental health care	598	33.9	671	38.1	1,150	65.2	1,253	71.1	1,340	76.0
PTSD clinic visit										
Primary care	0	—	152	.8	1,619	8.9	2,109	11.6	2,558	14.1
Same-day PC-MHI	0	—	29	1.9	282	18.7	340	22.6	390	25.9
Same-day specialty mental health care	133	7.5	167	9.5	424	24.1	484	27.5	541	30.7
Antidepressant prescription										
Primary care	751	4.1	2,114	11.6	4,599	25.3	5,550	30.6	6,434	35.4
Same-day PC-MHI	211	14.0	352	23.4	612	40.6	709	47.1	790	52.4
Same-day specialty mental health care	261	14.8	452	25.6	741	42.0	847	48.0	934	53.0
Any treatment initiation										
Primary care	837	4.6	2,549	14.0	7,193	39.6	8,481	46.7	9,552	52.6
Same-day PC-MHI	722	47.9	848	56.3	1,152	76.4	1,218	80.8	1,274	84.5
Same-day specialty mental health care	755	42.8	918	52.1	1,349	76.5	1,427	80.9	1,478	83.8

^a PC-MHI, mental health care integrated with primary care

were never married had lower odds of PTSD diagnosis within one year of screening.

Table 4 shows the results from the GEE models estimating the association between location of services and treatment initiation among the group of patients who received a PTSD diagnosis on the same day as their positive screen (N=5,966). For each model, patients who received same-day PC-MHI had significantly greater odds of initiating PTSD treatment within 12 weeks of their diagnosis compared with those in primary care (AORs ranged from 1.64 to 4.12). Receipt of same-day specialty mental health care was also associated with greater odds of PTSD treatment initiation (AORs ranging from 2.05 to 4.45). No differences were detected between the AORs for same-day PC-MHI and specialty care for the treatment models, with the exception of the antidepressant model ($p<.05$). In addition, patients ages 45–64 had lower odds of receiving an antidepressant and any treatment, and patients ≥ 65 had lower odds of receiving an antidepressant, Hispanic patients had greater odds of receiving psychotherapy and any treatment. Patients who were never married had lower odds of receiving an antidepressant and any treatment. Patients with a service connection of 50% or greater had lower odds of psychotherapy, a PTSD clinic visit, and any treatment. Individuals with a prior psychiatric diagnosis other than PTSD had lower odds of a PTSD clinic visit. Also, any prior outpatient use was associated with lower odds of receiving psychotherapy and any treatment, and individuals who had a PC-PTSD score of 4 versus 3 had greater odds of receiving

psychotherapy, having a PTSD clinic visit, and receiving an antidepressant prescription or any treatment.

DISCUSSION

To our knowledge, this was the first systemwide evaluation of the relationship between setting of services on the day of positive PTSD screening and subsequent PTSD diagnosis and treatment initiation in VHA. We found that same-day PC-MHI services compared with primary care-only services were associated with greater odds of receiving a PTSD diagnosis, both on the same day and up to one year after screening positive. Among patients diagnosed as having PTSD on the same day as their positive screen, same-day PC-MHI services were also associated with increased odds of initiating PTSD treatment within 12 weeks of diagnosis, compared with those receiving only primary care at screening. Such treatment initiation included the outcomes of PTSD clinic encounter as well as receipt of psychotherapy and antidepressant medications, which are in line with VHA PTSD treatment guidelines of referral to specialized care and initial treatment options for PTSD, respectively (1). Furthermore, same-day PC-MHI services had PTSD diagnosis and treatment initiation outcomes similar to those with same-day specialty mental health services.

The findings from this study are generally consistent with results from prior research demonstrating the utility of integrated mental health care services within the primary care setting. Such related prior work includes numerous randomized trials as well as several meta-analyses that support

TABLE 3. Estimated associations between location of services on PTSD screening date and same-day and one-year PTSD diagnosis (N=21,427)^a

Variable ^b	Same-day PTSD diagnosis			1-year PTSD diagnosis		
	AOR ^c	95% CI	p	AOR ^c	95% CI	p
Location (reference: primary care only)						
Same-day PC-MHI	2.23	1.95–2.56	<.001	1.67	1.48–1.88	<.001
Same-day specialty mental health care	2.56	2.24–2.93	<.001	2.03	1.81–2.28	<.001
Age group (reference: <45)						
45–64	.66	.61–.71	<.001	.64	.60–.68	<.001
≥65	.52	.47–.59	<.001	.43	.39–.48	<.001
Male (reference: female)	1.54	1.33–1.78	<.001	1.33	1.19–1.49	<.001
Race (reference: white)						
Black	.76	.69–.83	<.001	.78	.72–.85	<.001
Other	1.00	.87–1.16	.972	1.03	.88–1.21	.716
Unknown	.95	.86–1.04	.293	.88	.81–.96	.003
Hispanic ethnicity (reference: no)	.84	.73–.96	.013	.96	.83–1.12	.601
Marital status (reference: married)						
Not married	.89	.83–.96	.003	.75	.70–.80	<.001
Never married	.93	.85–1.01	.095	.78	.72–.84	<.001
Unknown	1.10	.85–1.40	.472	1.07	.85–1.35	.549
Service connection ≥50% (reference: <50%)	1.93	1.79–2.09	<.001	1.56	1.44–1.69	<.001
Any prior psychiatric diagnosis (reference: no)	.73	.65–.81	<.001	.80	.72–.88	<.001
Any prior VHA outpatient service use (reference: no)	.78	.72–.85	<.001	.83	.77–.89	<.001
PC-PTSD score=4 (reference: score=3)	1.62	1.51–1.73	<.001	1.82	1.72–1.93	<.001

^a Results are from two multivariable generalized estimating equations logistic regression models.

^b PC-MHI, mental health care integrated with primary care; VHA, Veterans Health Administration; PC-PTSD, Primary Care Posttraumatic Stress Disorder screen

^c Adjusted odds ratio. Models adjusted for all variables shown.

the efficacy of collaborative care for improving depression and depression-related outcomes (8,9,16,17). More similar to the specific outcomes studied in this investigation, results from another trial have shown that integrated care may improve mental health treatment access and engagement (18). Although fewer studies have focused specifically on individuals with PTSD, trials in this area have indicated positive initial results (7,19). For example, Schnurr and colleagues (7) found that patients with PTSD who were randomly assigned to a collaborative care intervention were more likely than those in a control condition to have a mental health visit, fill an antidepressant prescription, and have an antidepressant refill; however, no PTSD symptom differences were observed between groups at follow-up. With administrative data from systemwide PC-MHI implementation in VHA, results from our evaluation complement this growing PTSD-specific evidence base by providing empirical support for the potential benefit of integrated care on PTSD diagnosis and treatment initiation. Further research, however, is needed to examine whether such increases in diagnosis and treatment initiation associated

with PC-MHI services are also associated with improvements in treatment outcomes among patients with the disorder.

This study also provided evidence for the utility of PC-MHI in particular as an integrated care model that can facilitate psychiatric diagnosis and treatment. Recently, Pomerantz and colleagues (10) summarized key findings from published studies evaluating the VHA PC-MHI program. Results from our investigation parallel previous findings from such national and local evaluation efforts. Of note, the findings from this study are consistent with those from prior national evaluation studies, including a facility-level analysis that found increases in psychiatric diagnoses after PC-MHI implementation (12), a study with primary care patients that demonstrated that use of same-day PC-MHI services was associated with an increased likelihood of a subsequent mental health-related encounter (20), and a depression screening study that found that use of same-day PC-MHI services was associated with increased odds of initiating depression treatment within 12 weeks of screening (21). Our findings also correspond to those from prior regional and single-site analyses that suggest that PC-MHI programs may facilitate more timely treatment for those with positive mental health screens (22), increase access to mental health care (23–25), improve the likelihood of completion of PTSD specialty consultations (14), and promote shorter- and longer-term retention in mental health

treatment (26). Collectively, these findings support the role of PC-MHI in enhancing access to and engagement with mental health care in VHA.

This study enables better understanding of PTSD screening within VHA, specifically regarding mental health care subsequent to screening positive, by using data that span the entire health system. In a prior regional study of PTSD screening, older veterans compared with younger veterans had lower odds of a specialty mental health visit in the year after screening positive for PTSD (27). The oldest age group in that study was also less likely to receive a prescription for an antidepressant medication (27). On the basis of results from our investigation, such age-related treatment differences may be explained by our finding that older age groups were less likely to receive a PTSD diagnosis after screening positive. Clearly, further investigation is needed to better understand potential age-related PTSD treatment disparities. In another regional study that examined behavioral health screening, including PTSD, Shiner and colleagues (28) found that among patients who screened positive for PTSD, those treated in the PC-MHI or specialty

TABLE 4. Odds of PTSD treatment initiation within 12 weeks among 5,966 patients with a PTSD diagnosis on the index date of PTSD screening^a

Variable ^c	Psychotherapy			PTSD clinic			Antidepressant			Any treatment ^b		
	AOR ^d	95% CI	p	AOR ^d	95% CI	p	AOR ^d	95% CI	p	AOR ^d	95% CI	p
Location (reference: primary care only)												
Same-day PC-MHI	4.12	3.27–5.20	<.001	2.21	1.76–2.78	<.001	1.64	1.38–1.94	<.001	3.39	2.63–4.37	<.001
Same-day specialty mental health care	4.30	3.54–5.22	<.001	2.45	1.90–3.15	<.001	2.05	1.74–2.40	<.001	4.45	3.65–5.43	<.001
Age group (reference: <45)												
45–64	.99	.87–1.13	.912	1.10	.93–1.30	.283	.83	.74–.94	.003	.88	.79–.99	.032
≥65	.90	.72–1.13	.359	1.06	.80–1.40	.705	.79	.64–.98	.031	.84	.68–1.02	.079
Male (reference: female)	.87	.70–1.08	.211	1.29	.88–1.90	.198	.92	.70–1.21	.549	.92	.73–1.17	.498
Race (reference: white)												
Black	.90	.77–1.06	.204	1.09	.85–1.41	.504	.98	.85–1.14	.816	.90	.77–1.05	.170
Other	.90	.69–1.17	.435	1.40	.97–2.01	.069	1.02	.77–1.35	.882	.87	.65–1.15	.327
Unknown	.91	.78–1.07	.253	.98	.79–1.21	.818	.92	.78–1.08	.290	.86	.74–1.00	.044
Hispanic ethnicity (reference: no)	1.40	1.09–1.80	.009	1.02	.76–1.36	.891	1.14	.88–1.47	.327	1.33	1.02–1.72	.032
Marital status (reference: married)												
Not married	.89	.77–1.02	.098	.89	.73–1.09	.265	.99	.86–1.15	.924	.95	.83–1.09	.449
Never married	.92	.79–1.06	.258	.91	.77–1.08	.302	.76	.65–.87	<.001	.83	.72–.96	.010
Unknown	1.03	.69–1.53	.893	.62	.35–1.10	.103	1.17	.78–1.76	.445	1.28	.86–1.92	.161
Service connection ≥50% (reference: <50%)	.62	.55–.71	<.001	.71	.59–.86	<.001	1.00	.87–1.14	.956	.77	.68–.88	<.001
Any prior psychiatric diagnosis (reference: no)	.87	.70–1.08	.196	.68	.47–.97	.034	1.26	.99–1.60	.063	1.05	.84–1.31	.657
Any prior VHA outpatient service use (reference: no)	.88	.78–.99	.035	.96	.82–1.13	.641	.89	.80–1.00	.059	.86	.76–.96	.008
PC-PTSD score=4 (reference: score=3)	1.26	1.12–1.42	<.001	1.25	1.05–1.49	.014	1.35	1.20–1.52	<.001	1.39	1.25–1.56	<.001

^a Results are from two multivariable generalized estimating equations logistic regression models.^b Any combination of psychotherapy, PTSD clinic visit, or antidepressant prescription^c PC-MHI, mental health care integrated with primary care; VHA, Veterans Health Administration; PC-PTSD, Primary Care Posttraumatic Stress Disorder screen^d Adjusted odds ratio. Models adjusted for all variables shown.

setting were more likely than those in primary care to receive adequate treatment. Although we examined different, yet related, outcomes, findings from this study are broadly similar to those in the Shiner and colleagues study.

There were several potential limitations of our study. First, we conducted analyses of administrative data. Although models adjusted for several potential confounding variables, we cannot rule out the possibility that another unmeasured factor or incomplete adjustment might have accounted for the observed association linking same-day PC-MHI services (and same-day specialty mental health care) with increased odds of PTSD diagnosis and treatment initiation. For example, patients with more severe PTSD may have been more likely than others with PTSD to receive same-day PC-MHI; thus, analyses adjusted for PC-PTSD score. Second, some patients who had an initial positive screen in primary care may have left VHA before receiving a diagnosis. Third, it is expected that a percentage of patients in the sample who screened positive would not be diagnosed as having PTSD after a complete diagnostic assessment and would therefore either not require treatment or be

diagnosed as having another psychiatric condition. Consequently, for a more conservative approach, we conducted analyses of treatment initiation among only patients who received a PTSD diagnosis on their screening date. Fourth, administrative codes for receipt of psychotherapy and for receipt of medication are general and not specific to PTSD, which may partially explain the higher cumulative rates of treatment initiation than diagnoses. Fifth, the study was conducted in VHA; therefore, findings may not be generalizable to other settings.

CONCLUSIONS

Although PTSD screening is mandated within VHA, without proper follow-up, including diagnosis and treatment of those with the disorder, early efforts to identify and care for patients with PTSD will be suboptimal. Study findings indicate that same-day integrated mental health services within primary care may increase the likelihood of PTSD diagnosis and treatment. When patients screen positive for PTSD, primary care providers should consider engaging

integrated mental health services to help facilitate diagnostic assessment and treatment initiation.

AUTHOR AND ARTICLE INFORMATION

Dr. Bohnert and Dr. Sripada are with the Center for Clinical Management Research and all authors are with the Serious Mental Illness Treatment Resource and Evaluation Center (SMITREC), U.S. Department of Veterans Affairs (VA), Ann Arbor, Michigan. Dr. Bohnert, Dr. Sripada, and Dr. McCarthy are also with the Department of Psychiatry, University of Michigan Medical School, Ann Arbor (e-mail: kiplingb@med.umich.edu).

Study analyses were conducted as part of the VA National Primary Care–Mental Health Integration Evaluation (Dr. Mach and Dr. McCarthy). Dr. Bohnert is supported by a VA Health Services Research & Development Career Development Award (CDA 11-245). Dr. Sripada is supported by the SMITREC Advanced Fellowship Program in Mental Illness Research and Treatment from the VA Office of Academic Affiliations.

The authors report no financial relationships with commercial interests.

Received January 22, 2015; revision received April 6, 2015; accepted April 24, 2015; published online October 1, 2015.

REFERENCES

1. VA/DoD Clinical Practice Guideline for Management of Post-traumatic Stress. Washington, DC, US Department of Veterans Affairs, US Department of Defense, 2010
2. Office of Quality & Performance: FY 2011 Technical Manual, Q1. Volume 2. Washington, DC, US Veterans Health Administration, 2010
3. Prins A, Ouimette P, Kimerling R, et al: The primary care PTSD screen (PC-PTSD): development and operating characteristics. *Primary Care Psychiatry* 9:9–14, 2003
4. Donabedian A: *Aspects of Medical Care Administration: Specifying Requirements for Health Care*. Cambridge, Mass, Harvard University Press, 1973
5. Wang PS, Berglund P, Olfson M, et al: Failure and delay in initial treatment contact after first onset of mental disorders in the National Comorbidity Survey Replication. *Archives of General Psychiatry* 62:603–613, 2005
6. Lee DJ, Warner CH, Hoge CW: Advances and controversies in military posttraumatic stress disorder screening. *Current Psychiatry Reports* 16:467, 2014
7. Schnurr PP, Friedman MJ, Oxman TE, et al: RESPECT-PTSD: Re-Engineering Systems for the Primary Care Treatment of PTSD, a randomized controlled trial. *Journal of General Internal Medicine* 28:32–40, 2013
8. Gilbody S, Bower P, Fletcher J, et al: Collaborative care for depression: a cumulative meta-analysis and review of longer-term outcomes. *Archives of Internal Medicine* 166:2314–2321, 2006
9. Coventry PA, Hudson JL, Kontopantelis E, et al: Characteristics of effective collaborative care for treatment of depression: a systematic review and meta-regression of 74 randomised controlled trials. *PLoS ONE* 9:e108114, 2014
10. Pomerantz AS, Kearney LK, Wray LO, et al: Mental health services in the medical home in the Department of Veterans Affairs: factors for successful integration. *Psychological Services* 11:243–253, 2014
11. Post EP, Metzger M, Dumas P, et al: Integrating mental health into primary care within the Veterans Health Administration. *Families, Systems and Health* 28:83–90, 2010
12. Zivin K, Pfeiffer PN, Szymanski BR, et al: Initiation of Primary Care–Mental Health Integration programs in the VA health system: associations with psychiatric diagnoses in primary care. *Medical Care* 48:843–851, 2010
13. Pfeiffer PN, Szymanski BR, Zivin K, et al: Are primary care mental health services associated with differences in specialty mental health clinic use? *Psychiatric Services* 62:422–425, 2011
14. Brawer PA, Brugh AM, Martielli RP, et al: Enhancing entrance into PTSD treatment for post-deployment veterans through collaborative/integrative care. *Translational Behavioral Medicine* 1:609–614, 2011
15. Zeger SL, Liang KY, Albert PS: Models for longitudinal data: a generalized estimating equation approach. *Biometrics* 44:1049–1060, 1988
16. Katon W, Von Korff M, Lin E, et al: Stepped collaborative care for primary care patients with persistent symptoms of depression: a randomized trial. *Archives of General Psychiatry* 56:1109–1115, 1999
17. Unützer J, Katon W, Callahan CM, et al: Collaborative care management of late-life depression in the primary care setting: a randomized controlled trial. *JAMA* 288:2836–2845, 2002
18. Bartels SJ, Coakley EH, Zubritsky C, et al: Improving access to geriatric mental health services: a randomized trial comparing treatment engagement with integrated versus enhanced referral care for depression, anxiety, and at-risk alcohol use. *American Journal of Psychiatry* 161:1455–1462, 2004
19. Zatzick D, Jurkovich G, Rivara FP, et al: A randomized stepped care intervention trial targeting posttraumatic stress disorder for surgically hospitalized injury survivors. *Annals of Surgery* 257:390–399, 2013
20. Bohnert KM, Pfeiffer PN, Szymanski BR, et al: Continuation of care following an initial primary care visit with a mental health diagnosis: differences by receipt of VHA Primary Care–Mental Health Integration services. *General Hospital Psychiatry* 35:66–70, 2013
21. Szymanski BR, Bohnert KM, Zivin K, et al: Integrated care: treatment initiation following positive depression screens. *Journal of General Internal Medicine* 28:346–352, 2013
22. Watts BV, Shiner B, Pomerantz A, et al: Outcomes of a quality improvement project integrating mental health into primary care. *Quality and Safety in Health Care* 16:378–381, 2007
23. Brawer PA, Martielli R, Pye PL, et al: Louis Initiative for Integrated Care Excellence (SLI(2)CE): integrated-collaborative care on a large scale model. *Families, Systems and Health* 28(2):175–187, 2010
24. Pomerantz A, Cole BH, Watts BV, et al: Improving efficiency and access to mental health care: combining integrated care and advanced access. *General Hospital Psychiatry* 30:546–551, 2008
25. Pomerantz AS, Shiner B, Watts BV, et al: The White River model of colocated collaborative care: a platform for mental and behavioral health care in the medical home. *Families, Systems and Health* 28:114–129, 2010
26. Tsan JY, Zeber JE, Stock EM, et al: Primary care–mental health integration and treatment retention among Iraq and Afghanistan war veterans. *Psychological Services* 9:336–348, 2012
27. Lu MW, Carlson KF, Duckart JP, et al: The effects of age on initiation of mental health treatment after positive PTSD screens among Veterans Affairs primary care patients. *General Hospital Psychiatry* 34:654–659, 2012
28. Shiner B, Tang C, Trapp AC, et al: The provision of mental health treatment after screening: exploring the relationship between treatment setting and treatment intensity. *General Hospital Psychiatry* 36:581–588, 2014