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Psychiatric Diagnoses and Treatment of U.S. Military Personnel While Deployed to Iraq

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ABSTRACT Military personnel deployed in support of combat operations are at significantly higher risk for mental health problems. However, much of what we know about combat-related mental health comes from postdeployment assessments. This study describes the mental health of 1,336 treatment-seeking deployed U.S. military personnel and interventions recommended by military mental health providers in Iraq from January 2006 to January 2007. Cases were primarily young enlisted men, most of whom were on their first combat deployment. Marines made up the majority of the cases (60%), but there were also large numbers of Army and Navy personnel. The most common psychiatric diagnoses were anxiety disorders (31%, including 11% with posttraumatic stress disorder), followed by adjustment (27%) and mood disorders (25%, including 22% with depression). Medication was the most commonly prescribed treatment for patients with psychiatric diagnoses but was often combined with recommendations for psychotherapy/counseling and/or behavioral modifications. The findings illustrate the distribution of mental health conditions seen among treatment-seeking troops while actively serving in a combat environment and the interventions recommended for them. Further examination of postdeployment health outcomes may help to facilitate the development of more effective acute intervention strategies in theater.

INTRODUCTION

Recent military operations in Iraq (Operation Iraqi Freedom [OIF]) and Afghanistan (Operation Enduring Freedom [OEF]) have spurred increased concern regarding the effects of combat on the mental health of military personnel. There is ample evidence to suggest that exposure to military combat increases the risk of developing a range of mental health conditions, including posttraumatic stress disorder (PTSD), major depression, and substance abuse.[1–4] A major study found that up to 29% of service members screened positive for PTSD, generalized anxiety, or depression after combat deployment to Iraq, with alcohol misuse endorsed by up to 35% of personnel.[2] Service members deployed to Iraq during active combat operations were also more likely to report mental health problems than troops deployed to Afghanistan during that time,[1,2] which is likely due to the increased probability of combat exposure.

To date, most of the research on combat stress-related mental health disorders among active duty military personnel has been conducted before or following troops' deployment to OEF/OIF.[1,2,5] However, data collected outside of deployment can fail to capture the mental status of troops within combat zones and the potential effects on job performance. In addition, self-report assessments completed postdeployment can lead to biases in reporting symptoms and may not accurately capture the effects of combat on mental health. More detailed information on mental health problems in the combat theater could enable a better understanding of the development and prevention of combat-related psychiatric conditions. With such a large percentage of service members reporting PTSD and other mental health problems after returning from combat deployments, investigation of the mental health conditions of warfighters while in combat zones could be a vital component in reducing the postdeployment disease burden.

In addition to the limited knowledge about mental health conditions among military personnel while deployed to combat zones, there is also little information on how these conditions are managed in theater. A few articles have described psychiatric interventions in Iraq in various levels of detail, which include an overview of behavioral health consultations performed at a theater hospital and an aeromedical staging facility,[6] an overview and quantification of total Army behavioral health prevention and intervention efforts,[7] and case series reports of exposure therapy to treat acute or chronic PTSD symptoms[8,9] and imagery rehearsal therapy to treat acute nightmares.[10] Although mental health interventions in theater are restricted by the availability of resources in a combat zone, it is important to determine which interventions are the most effective and efficient treatments for deployed military personnel. Further study could lead to improved

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efforts to treat conditions in theater and produce better health outcomes postdeployment.

Using a database known as the Theater Mental Health Encounter Data (TMHED), which documented psychiatric clinical encounters in the Iraqi combat theater over a year-long period, the objectives of this study are to: (1) describe the sociodemographics of military personnel who sought in-theater mental health treatment, (2) determine the distribution of psychiatric conditions among these service members, including comorbidities, and (3) examine the interventions recommended in theater by mental health providers. This valuable information can provide a better understanding of the mental health of U.S. military personnel while deployed to a combat zone and support the development of acute intervention strategies and improvement of patient care for deployed troops.

METHODS

Study Design and Procedures

Data used for this study were collected by 19 U.S. Navy mental health providers (9 psychiatrists and 10 psychologists) serving with the 1st Marine Expeditionary Force in the combat theater primarily in and around the Al Anbar province of Iraq. These providers served a population of approximately 30,000 military personnel—primarily Marines, but also personnel from other service branches. Clinical encounters with service members seeking mental health treatment with these providers from January 2006 to January 2007 were documented in the TMHED database. Details on the collection of data used in this study have been described previously.[11]

The TMHED database contains information from 1,336 U.S. Marine Corps, Army, Navy, and Air Force patients and a total of 3,180 patient visits. At each encounter, providers recorded patient-reported information, including demographics, and provider-reported information, including psychiatric diagnoses and treatment plans. Treatment plans for each patient were derived from providers' notes and summarized into three categories where appropriate: medication, psychotherapy/counseling, and behavioral modifications (includes substance abuse/anger management classes, coping skills training, and self-care recommendations). Missing data on patient demographics were supplemented where possible with data from other military databases, including the Career History Archival Medical and Personnel System and the Defense Manpower Data Center. Determination and classification of psychiatric diagnoses in this report were based upon the DSM-IV-TR. The study design was reviewed and approved by the Naval Health Research Center Institutional Review Board.

Statistical Analyses

Descriptive statistics (percentages and means) were used to report the demographic characteristics of the cases, determine the distribution of diagnoses given in theater, and ascertain the allocation of planned interventions according to the given diagnosis. Fisher's exact tests were conducted to determine if the service branches differed in proportions of specific diagnoses. Statistical analyses were conducted with SPSS version 17.0,[12] and the alpha level for statistical significance was set at 0.05.

RESULTS

Patient Characteristics

The sociodemographic characteristics of these military patients (N = 1,336) are displayed in Table I. The average patient age was 26 years, and males accounted for 90% of the cases. Marines (60%) made up the majority of the patients, followed by Army (29%), Navy (11%), and a small number of Air Force (0.2%) personnel. The vast majority of patients were junior or mid-paygrade enlisted (E1–E6), whereas only 2% of patients were senior enlisted (E7–E9) and 4% were officers. Approximately 65% of patients were on their first combat deployment, whereas 28% were on their second deployment and 7% were on their third or greater deployment. The number of total mental health visits for each person recorded in this database ranged from 1 to 16, with half of the cases having only one documented visit. However, some patients may have had visits during the deployment that were not documented in the TMHED database because they occurred before or following the TMHED data collection period. A more detailed description of the patient demographic characteristics according to service branch and how they compared to the Iraqi combat theater-deployed population as a whole has been described previously.[11]

Psychiatric Diagnoses

The most common category of psychiatric diagnosis for these patients was anxiety disorders, with 31% receiving this diagnosis (Table II), including 11% diagnosed with PTSD and 8% with acute stress disorder (ASD). There were roughly similar numbers of adjustment and mood disorder diagnoses at 27% and 25%, respectively. Most of the mood disorder diagnoses were depressive disorders, which were given to 22% of all cases. Approximately 10% received substance use disorder diagnoses but after excluding tobacco dependence and withdrawal, only 8% of cases received that diagnosis, with most of those being alcohol-use disorder diagnoses. Only 4% of cases were diagnosed with sleep disorders, and roughly 24% of all patients were given "V-code" diagnoses (categorized in "Other conditions that may be a focus of clinical attention" in the DSM-IV-TR), such as bereavement or occupational/relational problems. Approximately 11% of cases were given a "no mental health diagnosis" determination by the provider, and only six patients (less than 0.5%) were missing any diagnostic determination.

When cases were examined according to service branch (excluding Air Force members, of which there were only three patients), diagnoses were fairly evenly distributed, with

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TABLE I. Demographic Characteristics (N = 1,336)

Patient Characteristic	N (%)
Gender	
Male	1,199 (89.7)
Female	137 (10.3)
Age (Years)	
18–24	762 (57.6)
25–29	269 (20.3)
30–39	231 (17.5)
≥40	60 (4.5)
Mean (SD)	25.9 (6.3)
Race/Ethnicity[a]	
White	928 (70.8)
Hispanic	165 (12.6)
Black	142 (10.8)
Asian	22 (1.7)
Other/Mixed	42 (3.2)
Service Branch	
Marines	796 (59.6)
Army	389 (29.1)
Navy	148 (11.1)
Air Force	3 (0.2)
Rank/Paygrade	
Enlisted 1–3	514 (38.5)
Enlisted 4–6	737 (55.2)
Enlisted 7–9	30 (2.2)
Officer/Warrant Officer	55 (4.1)
Total Combat Deployments[b]	
1	803 (64.7)
2	346 (27.9)
3	89 (7.2)
4 or More	3 (0.2)
Education	
High School Diploma or GED	977 (75.2)
Some College	210 (16.2)
College Graduate	112 (8.6)
Marital Status	
Single	635 (48.0)
Married/Cohabitating	622 (47.0)
Separated/Divorced	65 (4.9)
Number of Visits Per Person	
1	664 (49.7)
2	278 (20.8)
3	135 (10.1)
4 or More	259 (19.4)
Range	1–16

Sample size varies slightly across observations because of missing data. Unless otherwise indicated, data are expressed as number (percentage) of patients. Percentages have been rounded and may not total 100.

[a]Information on race/ethnicity came from the Career History Archival Medical and Personnel System database as this information was not gathered in TMHED. [b]Includes current deployment. Information on total number of combat deployments came from the Defense Manpower Data Center as this information was not consistent in TMHED.

a few exceptions. Army service members were more commonly diagnosed with depression and occupational/relational problems but less commonly diagnosed with ASD, compared to Marines.

Comorbid psychiatric disorders diagnosed at any visit while in theater are displayed in Table III. Roughly two-thirds of service members diagnosed with PTSD while deployed were also diagnosed with another psychiatric disorder. The most common condition comorbid with PTSD was depressive disorder (24% of patients diagnosed with PTSD were also diagnosed with a depressive disorder), followed by an anxiety disorder other than PTSD or ASD (16%). The majority of patients diagnosed with ASD were diagnosed with that condition alone (60%), while only 8% of service members with ASD also received a PTSD diagnosis at some point during the data collection period. Of the 83 service members diagnosed with an alcohol-use disorder, only three were diagnosed solely with that disorder. Alcohol-use disorders were most often comorbid with a depressive disorder (28%), PTSD (27%), or an adjustment disorder (24%).

Psychiatric Interventions

Of all patients diagnosed with a mental health condition, 41% received a treatment plan including medication, 35% were given a plan including psychotherapy or counseling, and 34% received behavioral modification recommendations (Table IV). Many patients were given a treatment plan consisting of a combination of those options. Although medications were the most common recommendation, many troops received plans for behavioral modifications that they could implement on their own time, such as assignments to help practice coping skills, recommendations for exercise or better sleep hygiene, attending classes for substance abuse or anger management or other activities to improve their mental well-being. The records of approximately 21% of diagnosed patients (245 cases) did not contain treatment plans specifically recommending medications, psychotherapy/counseling, or behavioral modifications, but many of those patients were given referrals to other providers for their treatment. Medical evacuation out of theater was considered or recommended by the provider for 4% of all patients (54 cases).

A further characterization of the medications prescribed by diagnosis (Table V) reveals that antidepressants were the drug type most frequently recommended in theater across all diagnostic categories, with 74% of all diagnosed patients with a medication treatment plan receiving a recommendation for this particular class of drugs. In addition, 36% of all diagnosed patients with a medication treatment plan received a recommendation for hypnotics, although only 11% of patients recommended to use hypnotics were actually diagnosed with a sleep disorder.

DISCUSSION

Using the unique TMHED database, this study offers a rare glimpse into the mental health needs of, and treatment plans given to, deployed U.S. troops in Iraqi combat zones. The troops were under extraordinary stress from being in an environment where danger was a constant presence and even "safe" zones were subject to attacks. In addition, the operational context in which care was delivered made it extremely difficult for troops to see a mental health provider because of

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TABLE II. Psychiatric Disorders Diagnosed at Any Visit in Theater

	Branch of Service			
	All Services (N = 1,336)	Marines (n = 796)	Army (n = 389)	Navy (n = 148)
Diagnosis	N (%)	N (%)	N (%)	N (%)
Anxiety	407 (30.5)	252 (31.7)	111 (28.6)	43 (29.1)
PTSD	152 (11.4)	91 (11.4)	47 (12.1)	14 (9.5)
ASD	111 (8.3)	86 (10.8)	13 (3.4)*	12 (8.1)
All Other Anxiety	184 (13.8)	103 (12.9)	62 (16.0)	18 (12.2)
Adjustment	360 (26.9)	205 (25.8)	116 (29.9)	38 (25.7)
Mood	340 (25.4)	180 (22.6)	122 (31.4)*	37 (25.0)
Depressive Disorder	299 (22.4)	161 (20.2)	105 (27.0)**	32 (21.6)
All Other Mood	56 (4.2)	27 (3.4)	22 (5.7)	7 (4.7)
Relational Problem	144 (10.8)	68 (8.5)	60 (15.4)**	15 (10.1)
Substance-related	137 (10.3)	82 (10.3)	43 (11.1)	12 (8.1)
Alcohol	83 (6.2)	50 (6.3)	25 (6.4)	8 (5.4)
Tobacco	46 (3.4)	24 (3.0)	18 (4.6)	4 (2.7)
Illicit Drugs/Prescriptions	25 (1.9)	18 (2.3)	7 (1.8)	0
Occupational Problem	117 (8.8)	53 (6.7)	50 (12.9)**	13 (8.8)
Personality	111 (8.3)	76 (9.5)	27 (7.0)	8 (5.4)
ADHD	56 (4.2)	29 (3.6)	22 (5.7)	5 (3.4)
Sleep	48 (3.6)	29 (3.6)	15 (3.9)	4 (2.7)
Bereavement	47 (3.5)	30 (3.8)	11 (2.8)	6 (4.1)
Other[a]	67 (5.0)	53 (6.7)	11 (2.8)**	3 (2.0)***
No Diagnosis[b]	146 (10.9)	95 (11.9)	31 (8.0)***	20 (13.5)

Percentage of patients does not total 100 across diagnostic categories because of comorbidity. Data are expressed as number (percentage) of patients. Percentages have been rounded and may not total 100. Significance tests reflect comparisons of diagnoses within the Army or Navy service branch compared to the Marine service branch. *$p < 0.001$; **$p < 0.01$; ***$p < 0.05$.

ADHD, attention-deficit hyperactivity disorder.

[a]Other: malingering (n = 13), psychotic disorder (n = 13), eating disorder (n = 12), somatoform disorder (n = 11), impulse control disorder (n = 8), cognitive disorder not otherwise specified (n = 4), dissociative disorder (n = 2), phase of life problem (n = 2), Asperger's syndrome (n = 2), personality change (n = 1), enuresis (n = 1), adverse effects of medication (n = 1), and conduct disorder (n = 1). Comparisons between service branches for each individual disorder included within the "Other" category revealed no significant differences. [b]Subject saw a provider but received a "no mental health diagnosis" determination. Not included in this table are the patients (n = 6) missing any diagnostic determination.

distance and transportation issues (i.e., weather, terrain, tactical situation) and the fact that the needs of the mission typically took priority. To resolve this, providers traveled extensively to outlying forward operating bases but because travel was extremely difficult, providers had to assume that the first encounter with a patient could be the patient's only encounter. Even when patients resided on the same base as providers, the wartime environment often made it difficult for patients to receive follow-up care. These contextual details should be used to inform further interpretation of results presented herein.

Anxiety disorders (the majority of which were PTSD or ASD diagnoses) were the most commonly diagnosed condition among TMHED cases, which reflects the current literature regarding the substantial prevalence of these disorders postdeployment.[2,13–15] Given that PTSD is common among service members returning from Iraq deployments (with "strict definition" rates of up to 17%),[2,13,14] it is suspected that the percentage of Iraq-deployed service members suffering from traumatic stress disorder symptoms in theater could be higher than indicated by PTSD rates among TMHED cases because of treatment avoidance, barriers to care issues, or delayed onset of full PTSD. Adjustment disorders were also commonly diagnosed, which could indicate that many service members may be overwhelmed by the operational stress of being deployed to a combat zone, or this diagnosis could reflect traumatic stress symptoms that do not meet the full criteria for ASD or PTSD. Previous literature has reported adjustment disorders as a common reason for psychiatric medical evacuation and hospitalization of soldiers deployed to Iraq and Afghanistan.[3,16]

As expected, many patients (approximately one-quarter of all cases) were diagnosed with a mood disorder, the majority of which were depressive disorders. Depression has been found to be common among military personnel returning from Iraq deployments (with "strict definition" depression rates of up to 8.5%),[2,13] and combat exposure has been shown to increase the risk for new onset depression.[17] It was not surprising that many troops were diagnosed with occupational/relational problems given the stress of deployment and separation from family; however, little is known about the prevalence of these diagnoses from postdeployment studies. The prevalence of substance abuse among this sample was much lower than is typically seen postdeployment,[2,18] which could be because of the prohibition of alcohol and illicit drug use while in theater. Finally, only 4% of cases were diagnosed with a sleep disorder even though poor sleep is common in the deployed environment,[19,20]

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TABLE III. Psychiatric Disorders Diagnosed at Any Visit in Theater and Comorbid Diagnoses[a]

Diagnosis	PTSD *N* (%)	ASD *N* (%)	All Other Anxiety *N* (%)	Adjustment *N* (%)	Depressive *N* (%)	All Other Mood *N* (%)	Relational Problem *N* (%)	Alcohol *N* (%)	Tobacco *N* (%)	Illicit Drugs/ Prescriptions *N* (%)	Occupational Problem *N* (%)	Personality *N* (%)	ADHD *N* (%)	Sleep *N* (%)	Bereavement *N* (%)	Other *N* (%)
PTSD[b] (*N* = 152)	**49** **(32.2)**	9 (5.9)	25 (16.4)	9 (5.9)	37 (24.3)	7 (4.6)	10 (6.6)	22 (14.5)	8 (5.3)	4 (2.6)	1 (0.7)	8 (5.3)	6 (3.9)	1 (0.7)	7 (4.6)	5 (3.3)
ASD[b] (*N* = 111)	9 (8.1)	**67** **(60.4)**	7 (6.3)	7 (6.3)	14 (12.6)	1 (0.9)	2 (1.8)	4 (3.6)	3 (2.7)	3 (2.7)	5 (4.5)	3 (2.7)	3 (2.7)	2 (1.8)	5 (4.5)	6 (5.4)
All Other Anxiety[b] (*N* = 184)	25 (13.6)	7 (3.8)	**76** **(41.3)**	20 (10.9)	41 (22.3)	9 (4.9)	18 (9.8)	9 (4.9)	11 (6.0)	2 (1.1)	4 (2.2)	9 (4.9)	5 (2.7)	4 (2.2)	3 (1.6)	6 (3.3)
Adjustment (*N* = 360)	9 (2.5)	7 (1.9)	20 (5.6)	**181** **(50.3)**	51 (14.2)	8 (2.2)	41 (11.4)	20 (5.6)	6 (1.7)	7 (1.9)	29 (8.1)	39 (10.8)	14 (3.9)	3 (0.8)	6 (1.7)	14 (3.9)
Depressive[c] (*N* = 299)	37 (12.4)	14 (4.7)	41 (13.7)	51 (17.1)	**98** **(32.8)**	15 (5.0)	29 (9.7)	23 (7.7)	17 (5.7)	5 (1.7)	13 (4.3)	40 (13.4)	10 (3.3)	4 (1.3)	7 (2.3)	14 (4.7)
All Other Mood[c] (*N* = 56)	7 (12.5)	1 (1.8)	9 (16.1)	8 (14.3)	15 (26.8)	**15** **(26.8)**	3 (5.4)	7 (12.5)	0	3 (5.4)	2 (3.6)	11 (19.6)	4 (7.1)	1 (1.8)	1 (1.8)	3 (5.4)
Relational Problem (*N* = 144)	10 (6.9)	2 (1.4)	18 (12.5)	41 (28.5)	29 (20.1)	3 (2.1)	**45** **(31.3)**	3 (2.1)	5 (3.5)	0	27 (18.8)	10 (6.9)	7 (4.9)	0	0	3 (2.1)
Alcohol[d] (*N* = 83)	22 (26.5)	4 (4.8)	9 (10.8)	20 (24.1)	23 (27.7)	7 (8.4)	3 (3.6)	**3** **(3.6)**	6 (7.2)	11 (13.3)	3 (3.6)	16 (19.3)	9 (10.8)	1 (1.2)	1 (1.2)	6 (7.2)
Tobacco[d] (*N* = 46)	8 (17.4)	3 (6.5)	11 (23.9)	6 (13.0)	17 (37.0)	0	5 (10.9)	6 (13.0)	**11** **(23.9)**	0	2 (4.3)	4 (8.7)	3 (6.5)	2 (4.3)	0	3 (6.5)
Illicit Drugs/ Prescriptions[d] (*N* = 25)	4 (16.0)	3 (12.0)	2 (8.0)	7 (28.0)	5 (20.0)	3 (12.0)	0	11 (44.0)	0	**5** **(20.0)**	0	7 (28.0)	1 (4.0)	0	1 (4.0)	3 (12.0)
Occupational Problem (*N* = 117)	1 (0.9)	5 (4.3)	4 (3.4)	29 (24.8)	13 (11.1)	2 (1.7)	27 (23.1)	3 (2.6)	2 (1.7)	0	**47** **(40.2)**	10 (8.5)	3 (2.6)	3 (2.6)	1 (0.9)	2 (1.7)
Personality (*N* = 111)	8 (7.2)	3 (2.7)	9 (8.1)	39 (35.1)	40 (36.0)	11 (9.9)	10 (9.0)	16 (14.4)	4 (3.6)	7 (6.3)	10 (9.0)	**6** **(5.4)**	9 (8.1)	1 (0.9)	2 (1.8)	18 (16.2)
ADHD (*N* = 56)	6 (10.7)	3 (5.4)	5 (8.9)	14 (25.0)	10 (17.9)	4 (7.1)	7 (12.5)	9 (16.1)	3 (5.4)	1 (1.8)	3 (5.4)	9 (16.1)	**11** **(19.6)**	1 (1.8)	0	7 (12.5)
Sleep (*N* = 48)	1 (2.1)	2 (4.2)	4 (8.3)	3 (6.3)	4 (8.3)	1 (2.1)	0	1 (2.1)	2 (4.2)	0	3 (6.3)	1 (2.1)	1 (2.1)	**28** **(58.3)**	1 (2.1)	1 (2.1)
Bereavement (*N* = 47)	7 (14.9)	5 (10.6)	3 (6.4)	6 (12.8)	7 (14.9)	1 (2.1)	0	1 (2.1)	0	1 (2.1)	1 (2.1)	2 (4.3)	0	1 (2.1)	**20** **(42.6)**	1 (2.1)
Other[e] (*N* = 67)	5 (7.5)	6 (9.0)	6 (9.0)	14 (20.9)	14 (20.9)	3 (4.5)	3 (4.5)	6 (9.0)	3 (4.5)	3 (4.5)	2 (3.0)	18 (26.9)	7 (10.4)	1 (1.5)	1 (1.5)	**18** **(26.9)**

Percentage of patients within each diagnostic category does not total 100 because of comorbidity. Data are expressed as number (percentage) of patients.
[a]Bold numbering indicates non-comorbid cases. [b]Included within anxiety disorder category. [c]Included in the mood disorder category. [d]Included within substance-related disorder category. [e]Other: See Table II.

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TABLE IV. Treatment Plan Across All Visits According to Diagnosis

	Medication					Psychotherapy/Counseling			Behavioral Modifications[a]	
	Any	Alone	With Psychotherapy/ Counseling	With Behavioral Modifications	With Psychotherapy/ Counseling and Behavioral Modifications	Any	Alone	With Behavioral Modifications	Any	Alone
Diagnosis	*N* (%)	*N* (%)	*N* (%)	*N* (%)	*N* (%)	*N* (%)	*N* (%)	*N* (%)	*N* (%)	*N* (%)
PTSD[b] (*N* = 152)	95 (62.5)	40 (26.3)	26 (17.1)	20 (13.2)	9 (5.9)	61 (40.1)	19 (12.5)	7 (4.6)	48 (31.6)	12 (7.9)
ASD[b] (*N* = 111)	26 (23.4)	10 (9.0)	9 (8.1)	6 (5.4)	1 (0.9)	58 (52.3)	29 (26.1)	19 (17.1)	49 (44.1)	23 (20.7)
All Other Anxiety[b] (*N* = 184)	113 (61.4)	60 (32.6)	16 (8.7)	32 (17.4)	5 (2.7)	54 (29.3)	21 (11.4)	12 (6.5)	68 (37.0)	19 (10.3)
Adjustment (*N* = 360)	113 (31.4)	53 (14.7)	24 (6.7)	25 (6.9)	11 (3.1)	140 (38.9)	89 (24.7)	16 (4.4)	117 (32.5)	65 (18.1)
Depressive[c] (*N* = 299)	204 (68.2)	82 (27.4)	61 (20.4)	42 (14.0)	19 (6.4)	114 (38.1)	21 (7.0)	13 (4.3)	96 (32.1)	22 (7.4)
All Other Mood[c] (*N* = 56)	38 (67.9)	17 (30.4)	7 (12.5)	14 (25.0)	0	16 (28.6)	4 (7.1)	5 (8.9)	23 (41.1)	4 (7.1)
Relational Problem (*N* = 144)	36 (25.0)	8 (5.6)	12 (8.3)	9 (6.3)	7 (4.9)	64 (44.4)	32 (22.2)	13 (9.0)	54 (37.5)	25 (17.4)
Alcohol[d] (*N* = 83)	34 (41.0)	9 (10.8)	6 (7.2)	13 (15.7)	6 (7.2)	34 (41.0)	12 (14.5)	10 (12.0)	46 (55.4)	17 (20.5)
Tobacco[d] (*N* = 46)	32 (69.6)	9 (19.6)	0	18 (39.1)	5 (10.9)	6 (13.0)	0	1 (2.2)	28 (60.9)	4 (8.7)
Illicit Drugs/ Prescriptions[d] (*N* = 25)	5 (20.0)	1 (4.0)	2 (8.0)	2 (8.0)	0	13 (52.0)	6 (24.0)	5 (20.0)	14 (56.0)	7 (28.0)
Occupational Problem (*N* = 117)	19 (16.2)	8 (6.8)	5 (4.3)	4 (3.4)	2 (1.7)	36 (30.8)	20 (17.1)	9 (7.7)	44 (37.6)	29 (24.8)
Personality (*N* = 111)	41 (36.9)	20 (18.0)	4 (3.6)	11 (9.9)	6 (5.4)	37 (33.3)	15 (13.5)	12 (10.8)	50 (45.0)	21 (18.9)
ADHD (*N* = 56)	31 (55.4)	13 (23.2)	7 (12.5)	9 (16.1)	2 (3.6)	19 (33.9)	5 (8.9)	5 (8.9)	22 (39.3)	6 (10.7)
Sleep (*N* = 48)	29 (60.4)	14 (29.2)	2 (4.2)	12 (25.0)	1 (2.1)	7 (14.6)	3 (6.3)	1 (2.1)	18 (37.5)	4 (8.3)
Bereavement (*N* = 47)	19 (40.4)	9 (19.1)	5 (10.6)	3 (6.4)	2 (4.3)	26 (55.3)	11 (23.4)	8 (17.0)	19 (40.4)	6 (12.8)
Other[e] (*N* = 67)	22 (32.8)	13 (19.4)	3 (4.5)	5 (7.5)	1 (1.5)	17 (25.4)	10 (14.9)	3 (4.5)	23 (34.3)	14 (20.9)
All Diagnoses (*N* = 1,184)	481 (40.6)	230 (19.4)	104 (8.8)	118 (10.0)	29 (2.4)	408 (34.5)	203 (17.1)	72 (6.1)	402 (34.0)	183 (15.5)
No Diagnosis[f] (*N* = 146)	8 (5.5)	4 (2.7)	1 (0.7)	1 (0.7)	2 (1.4)	9 (6.2)	6 (4.1)	0	20 (13.7)	17 (11.6)

Percentage of patients within each treatment category does not total 100 because of multiple treatment plans and plans not listed. Data are expressed as number (percentage) of patients.
[a]Includes substance abuse classes, coping skills training (anger, stress, anxiety, and relationship management skills training), and self-care recommendations. [b]Included within anxiety disorder category. [c]Included within mood disorder category. [d]Included within substance-related disorder category. [e]Other: See Table II. [f]Subject saw a provider but received a "no mental health diagnosis" determination.

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TABLE V. Type of Medication Prescribed According to Diagnosis[a]

Diagnosis	Antidepressant N (%)	Anxiolytic N (%)	Hypnotic N (%)	Antipsychotic N (%)	Other N (%)
PTSD[b] (N = 95)	75 (78.9)	20 (21.1)	36 (37.9)	13 (13.7)	4 (4.2)
ASD[b] (N = 26)	14 (53.8)	5 (19.2)	18 (69.2)	4 (15.4)	3 (11.5)
All Other Anxiety[b] (N = 113)	92 (81.4)	40 (35.4)	33 (29.2)	6 (5.3)	7 (6.2)
Adjustment (N = 113)	80 (70.8)	15 (13.3)	48 (42.5)	5 (4.4)	10 (8.8)
Depressive[c] (N = 204)	150 (73.5)	16 (7.8)	28 (13.7)	3 (1.5)	7 (3.4)
All Other Mood[c] (N = 38)	21 (55.3)	5 (13.2)	4 (10.5)	3 (7.9)	5 (13.2)
Relational Problem (N = 36)	30 (83.3)	6 (16.7)	15 (41.7)	0	1 (2.8)
Alcohol[d] (N = 34)	28 (82.4)	3 (8.8)	14 (41.2)	5 (14.7)	2 (5.9)
Tobacco[d] (N = 32)	27 (84.4)	5 (15.6)	16 (50.0)	0	5 (15.6)
Illicit Drugs/Prescriptions[d] (N = 5)	3 (60.0)	0	1 (20.0)	1 (20.0)	0
Occupational Problem (N = 19)	15 (78.9)	2 (10.5)	9 (47.4)	1 (5.3)	1 (5.3)
Personality (N = 41)	30 (73.2)	9 (22.0)	18 (43.9)	7 (17.1)	2 (4.9)
ADHD (N = 31)	20 (64.5)	3 (9.7)	5 (16.1)	0	14 (45.2)
Sleep (N = 29)	9 (31.0)	6 (20.7)	19 (65.5)	4 (13.8)	1 (3.4)
Bereavement (N = 19)	11 (57.9)	3 (15.8)	9 (47.4)	3 (15.8)	0
Other[e] (N = 22)	15 (68.2)	2 (9.1)	1 (4.5)	3 (13.6)	1 (4.5)
All Diagnoses (N = 481)	357 (74.2)	86 (17.9)	171 (35.6)	40 (8.3)	40 (8.3)
No Diagnosis[f] (N = 8)	3 (37.5)	1 (12.5)	2 (25.0)	0	2 (25.0)

Percentage of patients within each medication category does not total 100 because of multiple medication plans. Data are expressed as number (percentage) of patients.

[a]Only the patients given recommendations for at least 1 medication are included in this table (N = 489). [b]Included within anxiety disorder category. [c]Included within mood disorder category. [d]Included within substance-related disorder category. [e]Other: See Table II. [f]Subject saw a provider but received a "no mental health diagnosis" determination.

possibly because of providers' hesitation to diagnose this psychiatric disorder when suboptimal sleep is virtually the norm among many deployed troops, given the nature of combat zone operations.

Investigation of the distribution of diagnoses between service branches revealed that Army personnel were more commonly diagnosed with depression and occupational/relational problems but less commonly diagnosed with ASD, compared to Marines. These findings were somewhat unexpected as previous research has found a similar prevalence of depression among both Army and Marine personnel after returning from deployment to Iraq,[2] although prevalence of occupational/relational problems has not been compared between these groups to our knowledge. The higher prevalence of these disorders among Army members could be due in part to the increased stress of OIF deployments that can be several months longer for Soldiers compared to Marine deployments. Conversely, the lower prevalence of ASD may be because of differences in job assignments of Soldiers and Marines serving within the catchment area for this study: Army personnel were primarily conducting logistics operations, whereas the Marines were heavily involved in conducting combat missions. Therefore, Marines in this area may have been more likely to experience combat stress reactions. Alternatively, there may have been a cross-branch cultural difference or diagnosing bias between the Navy providers and their Army patients that may have led to higher diagnoses of these conditions compared to Marine patients.

Analysis of psychiatric comorbidities revealed several notable findings. There were few PTSD–ASD comorbidities, which was surprising given the high conversion rate of ASD to PTSD in the literature.[21] This finding may be a reflection of the fact that approximately half of service members diagnosed with ASD had only one encounter during the data collection period, and therefore future conversion would not be captured in the database. In accordance with the current knowledge of PTSD comorbidity,[22,23] most patients diagnosed with PTSD also received other diagnoses, including nearly one-quarter with depression. PTSD is frequently comorbid with depression,[22,23] and this comorbidity has even been proposed to be a separate disorder in some cases.[24] In addition, service members diagnosed with alcohol problems often were also diagnosed with PTSD, depression, or adjustment disorders. Alcohol-use disorders are commonly comorbid with other psychiatric disorders[25,26] and could be attributable to self-medication or factors shared between these disorders. Many of the comorbidities observed in theater are similar to those seen out of theater among both civilian and military populations, suggesting that the same disorders can be found in the same combinations across very different populations and environments.

The description of mental health provider-recommended interventions gives some insight into the capabilities and limitations of mental health treatment in a combat zone. For example, psychotherapy is often a recommended course of action for a PTSD diagnosis,[27] yet while 63% of patients with a PTSD diagnosis were prescribed medication, only 40% had recommendations for psychotherapy or counseling. Furthermore, the therapy recommendations were mainly for supportive counseling instead of a full course of trauma-focused psychotherapy. The inhospitable environment and access-to-care

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issues were likely the primary reasons for the lack of trauma-focused psychotherapy recommendations, in addition to the lack of clinical guidelines regarding the use of cognitive behavioral therapies in a combat environment. Medications were often the most practical option to manage various mental health conditions in theater. However, most patients who received medication plans also were recommended some form of psychotherapy/counseling and/or behavioral modifications that could be practiced in the absence of a provider to help manage their condition(s).

A closer look at medications prescribed in theater revealed that antidepressants were the most commonly recommended class of drugs in this patient population, although many patients received recommendations for hypnotics—presumably for sleeping difficulties. In contrast, a survey of a nonclinical sample of Army personnel in Iraq reported that more Soldiers were taking sleep medications while deployed than medications for mental health or combat stress problems, such as antidepressants.[28] The frequent prescription of hypnotics among patients in the current study appears to provide support for previous reports of poor sleep in the deployed environment.[19,20] These data highlight the fact that a large portion of deployed military personnel who seek mental health treatment are using medications to manage their mental health and sleep problems in a high-stress combat environment, and the possibility of medication side effects impacting job performance should not be ignored.

Although the available TMHED data did not allow the examination of intervention effectiveness in theater, future research investigating postdeployment health outcomes of patients in this study may help to determine which interventions are associated with long-term improvement in mental health. Evaluations of psychiatric interventions conducted in the combat theater are limited, but have included case series reports of treating acute or chronic PTSD symptoms with exposure therapy,[8,9] a case series report of acute nightmare treatment using imagery rehearsal therapy,[10] and an evaluation of psychological briefings and social support after traumatic events.[29] Although each of these studies reported some success, much more research is needed to determine the extent and duration of each treatment's effectiveness for various mental health conditions. Future efforts to collect in-theater mental health encounter data should aim to better track mental health outcomes to evaluate the effectiveness of in-theater psychiatric interventions.

The findings from this study support the existing literature on the increasing psychiatric burden that can last for years after troops' return from deployment. Because of the difficulty of treating psychiatric conditions in theater, the interventions described here are more likely to be temporary solutions to maintain the strength of the deployed force rather than providing long-term resolution. As such, many patients are likely to continue experiencing mental health problems after returning from deployment. Many of the disorders commonly seen among patients in the TMHED database, such as PTSD, depression, anxiety, alcohol abuse, and sleep difficulties, are also the most common psychiatric problems among troops assessed postdeployment.[2,30,31] These disorders can have serious long-term consequences for the mental and physical health of troops as well as negatively impacting occupational and social functioning,[13,32–34] resulting in a decreased overall quality of life.[32,35,36] To minimize these aftereffects of combat deployments, it is essential that all troops returning from deployment are screened for mental health conditions at multiple intervals in a format that maximizes the likelihood of disclosure and are provided prompt, effective care for these conditions.

Several limitations must be considered when interpreting these results and implications. Because patients in this study were individuals who sought (or were recommended for) mental health treatment, the distribution of diagnoses is not necessarily representative of the prevalence of each disorder in the entire Iraq-deployed population. In addition, treatment plans were obtained from the clinician's notes from each encounter and in some cases, the plans could not be easily distinguished or were absent from the notes in the database. Moreover, we did not take into consideration pre-existing psychiatric conditions of patients in this study,[37] which may have affected providers' treatment plans. Further, the interventions prescribed are not indicative of actual patient compliance, and further study of health outcomes should take this into consideration.

Another limitation is the impact of comorbid diagnoses on the interpretation of treatment plans. For example, some patients with comorbid conditions may have received medications and/or psychotherapy to manage one or both of the conditions, so it cannot be assumed that a particular treatment plan was given for a particular condition in cases of comorbidity. In addition, treatment plans varied significantly according to provider (psychologists were more likely than psychiatrists to recommend psychotherapy). Some providers may also have favored a particular medication class or treatment modality, possibly leading toward disproportionate treatment plan recommendations. Furthermore, the range of medications was limited because of availability of resources in the deployed environment, which may have affected treatment plans. Finally, these treatment plans are specific to U.S. Navy mental health providers and may be different from treatments given in combat zones by providers from other service branches.

Despite these limitations, this study presents valuable findings of a unique and comprehensive clinical database collected in the Iraqi combat theater, including a detailed description of psychiatric diagnoses and plans for interventions given to treatment-seeking military personnel. Notably, these findings demonstrate the feasibility and importance of documenting in-theater patient encounters that can provide insight into the immediate effects of combat on mental health and track changes in mental health among deployed troops. Furthermore, collection of mental health encounter

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data in theater can inform not only decision making at medical treatment facilities, but also help tailor postdeployment care on an individual basis. Providing easily accessible mental health care in theater and continuing to collect data on these encounters are vital to quickly treat acute reactions to combat stress and prevent chronic conditions from worsening in the combat zone, as well as informing and improving postdeployment care for combat troops. Future research should focus on investigating postdeployment health outcomes of patients in this study and determining the most effective treatments in theater to improve mental health care for deployed troops.

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