

Use of Acupuncture in the United States Military Healthcare System

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ABSTRACT

Objectives: The Military Healthcare System (MHS) shows increasing interest in acupuncture as an alternative to opioids for pain control. However, specific factors associated with this procedure in the MHS are not well-described in literature. This study examines usage within the MHS to determine patterns among the diagnoses, provider types, and facilities associated with acupuncture.

Materials and Methods: Acupuncture-treated patients were identified from TRICARE claims data in the MHS Data Repository as having at least one acupuncture treatment in fiscal year (FY) 2014. Bivariate analysis was performed to determine demographics, diagnoses, and number of visits, for both active-duty and nonactive-duty personnel. Descriptive statistics were used to show associated provider and facility types.

Results: A total of 15,761 people received acupuncture in the MHS in FY 2014. Use of acupuncture was greater for Army service, white race, and senior enlisted rank overall, and for males ages 26–35 among active-duty and females ages 46–64 among nonactive-duty beneficiaries. A cumulative 76% of diagnoses were for musculoskeletal or nerve and system issues. Approximately 60% of patients received acupuncture from physicians, 16% from physical therapists or chiropractors, and 9.7% from physician extenders. Specific acupuncture techniques (traditional, auricular, etc.) could not be determined from the data set.

Conclusions: The most common diagnoses associated with acupuncture are consistent with pain management. However, full analysis is hampered by inconsistent coding and lack of granularity regarding specific techniques. Given the popularity of acupuncture in the MHS, further research is necessary to explore the full scope of this intervention.

Keywords: acupuncture, integrative medicine, pain management, military health system, physician extender

INTRODUCTION

CHRONIC PAIN—pain lasting more than 3 months,¹—has been described as a signature wound of the current

conflicts in the Middle East and is considered part of a “polytrauma triad” which also includes traumatic brain injury and post-traumatic stress disorder (PTSD).² Studies have demonstrated a prevalence of chronic pain at 44% of

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returning soldiers who were not seeking care, with 48.3% of these reporting pain of a year or more in duration.³ In light of the military culture that prizes stoicism and often stigmatizes help-seeking,^{4,5} these data suggest that chronic pain in the military may be underreported.

Conventional treatment of chronic pain relies on opioids and presents risks of misuse, as well as adverse side-effects including nausea, constipation, respiratory depression, drowsiness, and cognitive impairment.⁶ These effects can impair performance while failing to relieve pain fully,⁷ leading to an overall decrease in military readiness^{4,8,9} and indicating a need for nonopioid alternative or adjunct therapies. One popular choice is acupuncture, which was included in the 2010 report by the Army Pain Management Task Force in its list of recommendations to address chronic pain.¹⁰ While considered a nonconventional therapy in some sectors,¹¹ acupuncture has been provided in the Military Health System (MHS) since 2005,¹² and was provided at 83 Military Treatment Facilities (MTFs) as of 2013.¹³ Multiple techniques are reported in use, including a simplified auricular technique known as Battlefield Acupuncture (BFA).¹⁴ However, specific clinical indications for acupuncture and prevalence of individual techniques within the MHS are poorly described in published literature and usage has not been assessed at the patient level.

This research was conducted to describe the use of acupuncture in the MHS, which serves 9.4 million military members, beneficiaries, and retirees at MTFs, including 55 hospitals and 373 military medical clinics.^{15,16} This description includes recipient demographics, types of providers and facilities, and diagnoses for which patients were referred. While a determination of acupuncture's specific effectiveness is beyond the scope of this article, answers to the above questions will provide a foundation for further investigation of acupuncture among service members and beneficiaries.

MATERIALS AND METHODS

The Military Health System Data Repository (MDR) captures healthcare claims data for people utilizing the Military Health System in facilities owned and operated by the Department of Defense (DoD) and care paid for under the TRICARE benefit at non-DoD operated sources. Under the scope of the Comparative Effectiveness and Provider Induced Demand Collaboration (EPIC), this study used the MDR to access direct, outpatient care for TRICARE Prime-eligible beneficiaries over age 18 who received acupuncture at least once within fiscal year 2014. TRICARE Prime is the health insurance program for uniformed service personnel, retirees, and their dependents, who can receive medical coverage at MTFs. Data from this large population can provide a better understanding of acupuncture use and patterns of demographic factors.

Patient records with Current Procedural Terminology (CPT) codes for acupuncture were assessed; the codes were as follows: 97810 Acupuncture, one or more needles, WITHOUT Stimulation, Initial 15 minutes; 97811 Acupuncture, one or more needles, WITHOUT Stimulation, Additional 15 minutes; 97813 Acupuncture, one or more needles, WITH Stimulation, Initial 15 minutes; 97814 Acupuncture, one or more needles, WITH Stimulation, Additional 15 minutes. Non-needle modalities, such as laser acupuncture, were not assessed, as they do not have specific CPT codes, and may be recorded under related modalities (e.g., infrared treatment), which also include nonacupuncture treatments. Provider types were categorized using taxonomy codes established by the Health Insurance Portability and Accountability Act (HIPAA). Demographic and clinical variables included age, gender, race, service branch (Army, Navy, Air Force, Marine Corps, Coast Guard, U.S. Public Health Service, and Other), military rank (junior enlisted, senior enlisted, warrant officer, junior officer, senior officer, cadet, and other), and diagnosis groups that were stratified by sponsor status (active military members, active reserve/guard, retirees and civilians [dependents]).

Most common provider types and clinical settings linked with patients whose treatments had an acupuncture procedure code were also analyzed. Race, branch of service, and sponsor status were obtained from the Defense Enrollment Eligibility Reporting System records using a unique identifier to match with patients found in the military's direct care, outpatient claims data. Missing race data for dependents was imputed by observing same filled race values in our population and weighing by sponsor status to observe a complete scope of race.¹⁷ Statistical analysis was performed in The Statistical Analysis System (SAS) software, SAS version 9.4, 2013 (SAS Institute, Cary, NC). Findings included descriptive statistics by a cross-tabulation of demographics and sponsor status, and with diagnosis groups. Frequency of patients with acupuncture use were categorized by top providers and top clinical settings.

RESULTS

Population Demographics

In 2014, a total of 15,761 individuals received acupuncture in the MHS. Of these, active-duty personnel received acupuncture approximately twice as often as nonactive-duty personnel (11,213 versus 4548). Because dependents are not required to report their races when enrolling in the MHS, the quality of dependent race data is poor, whereas sponsors are required to report this, and therefore quality for sponsor race data is strong. With 13% of the study population missing race, an imputation method was used to replace missing values as described in Materials and Methods.

The greatest number of active-duty personnel receiving acupuncture were those of Army service (56.9%), white

TABLE 1. STUDY POPULATION DEMOGRAPHICS, FISCAL YEAR 2014 (N=15,761)

<i>Demographics</i>	<i>Active</i>	<i>Active reserve/guard</i>	<i>Retirees</i>	<i>Civilians</i>	<i>Total (n)</i>	<i>%</i>
Age						
18–25	2,048	44	3	249	2,344	14.9
26–35	4,092	216	42	636	4,986	31.6
36–45	3,248	309	172	698	4,427	28.1
46–65	935	319	902	1,223	3,379	21.4
66+	2	0	250	373	625	4.0
Gender						
Female	2,733	228	292	3,006	6,259	39.7
Male	7,592	660	1,077	173	9,502	60.3
Race						
Caucasian	7,164	556	789	1,904	10,423	65.9
Black	1,728	212	268	467	2,675	17.2
Asian or Pacific Islander	793	63	75	265	1,196	7.2
American Indian/Alaskan native	150	7	8	26	191	1.3
Other	353	40	69	114	576	3.8
Unknown	137	0	160	403	700	4.6
Service branch						
Army	5,563	716	527	1,231	8,037	51.0
Navy	1,780	47	379	801	3,007	19.1
Air Force	1,615	103	356	814	2,888	18.3
Marine Corps	1,197	15	81	278	1,571	10.0
Coast Guard	81	1	16	36	134	0.9
Public Health Service	34	0	7	11	52	0.3
Other	1	0	0	0	1	0.01
(missing = 71)						
Rank						
Enlisted, Senior	4,225	495	973	1,667	7,360	46.7
Enlisted, Junior	4,121	180	38	476	4,815	30.6
Officer, Senior	346	54	187	350	937	5.9
Officer, Junior	1,338	130	123	416	2,007	12.7
Warrant Officer	186	25	39	96	346	2.2
Cadet	17	0	0	1	18	0.1
Other	13	3	1	163	180	1.1
(missing = 118)						
Sponsor						
Sponsor	10,265	880	1,363	98	12,606	80.0
Dependent	6	2	3	3,073	3,084	19.6
(missing = 71)						

race (68.9%), male gender (73.6%), ages 26–35 (38.4%), and senior enlisted rank (42.4%). The greatest numbers of nonactive-duty personnel receiving acupuncture were those of Army service (37.6%), white race (59.2%), female gender (72.5%), ages 45–64 (46.7%), and senior enlisted rank (58.3%) See Table 1.

Diagnosis Groups and Provider Types

A combined 76% of patients receiving acupuncture had diagnoses related to issues of musculoskeletal (60.9%) or nerves and systems (14.9%), with an additional 8.8% for mental issues. The top diagnoses were similar among active- and nonactive-duty beneficiaries (Table 2). The re-

mainder of diagnoses included 5.7% ill-defined, 3.8% supplementary classification, and 2.7% injury and poisoning, and 12 additional diagnoses, each accounting for <1% of patients receiving acupuncture.

The majority of patients (60%) received care from physicians with the most common providers in family medicine (26.7%) or physical medicine (13.6%). An additional 16.3% of patients received acupuncture from physical therapists or chiropractors, who may be credentialed without an MD. Approximately 9.7% of patients received acupuncture from physician extenders, such as nurse practitioners, physician assistants, technicians, or corpsmen; 7% of patients received acupuncture from mental and social health professionals; and 4% of patients received acupuncture from chiropractors

TABLE 2. DIAGNOSIS GROUPS, FISCAL YEAR 2014 (ICD-9-CM)

Diagnosis groups	Active	Active reserve/guard	Retirees	Civilians	Total # of patients	% of Patients
Musculoskeletal	6,230	594	895	1,885	9,604	60.9
Nerves & senses	1,387	120	245	603	2,355	14.9
Mental	1,108	64	46	162	1,380	8.8
Ill-defined	634	44	61	163	902	5.7
Supplementary classifications	469	23	29	76	597	3.8
Injury & poisoning	290	21	35	80	426	2.7
Genitourinary	65	6	7	63	141	0.9
Endocrine & metabolism	27	2	17	35	81	0.5
Digestive system	25	4	9	32	70	0.4
Respiratory system	27	2	5	18	52	0.3
Skin	20	4	4	17	45	0.3
Circulatory system	6	3	8	13	30	0.2
Pregnancy/childbirth	8	0	0	14	22	0.1
Infections & parasites	6	1	4	1	17	0.1
Neoplasms	8	0	3	6	17	0.1
Congenital anomalies	13	0	0	2	15	0.1
Perinatal	2	0	0	4	6	0.04
Blood	0	0	1	0	1	0.01
Total	10,325	888	1,369	3,179	15,761	100

ICD-9-CM, *International Classification of Diseases, Ninth Revision, Clinical Modification*.

(Table 3). Similarly, a combined 51.3% of patients received treatment at family practice (25.5%), physical medicine and rehabilitation (13.5%), or physical therapy facilities (12.3%) See Table 4. Overall, treatment was provided at 94 MTFs, including 48 hospitals, 43 clinics, and 3 other facilities (Table 5). Taken together, this is consistent with pain control under the treatment of a physician.

TABLE 3. TOP 20 PROVIDER TYPES

Providers	# of Patients	% of Patients
Family practice physician	4,201	26.7
Physical medicine physician	2,152	13.7
Physical therapist	1,939	12.3
Neurologist	884	5.6
Social worker (provides therapy)	811	5.1
Physician assistant	670	4.3
Chiropractor	632	4.0
Anesthesiologist	527	3.3
Internist	506	3.2
Primary care nurse-practitioner	412	2.6
Family practice physician resident	338	2.1
Aerospace medicine flight surgeon	293	1.9
Aerospace medicine physician	292	1.8
Corpsman, independent duty	262	1.7
Corpsman/technician	206	1.3
General medical officer	186	1.2
Psychiatrist	167	1.1
Clinical psychologist	139	0.9
Preventive medicine physician	116	0.7
Pediatrician	50	0.3
Other service provider	978	6.2

DISCUSSION

Major Findings

Overall, findings of this study were consistent with physician-provided efforts to control pain, and top diagnoses were similar between active- and nonactive-duty beneficiaries. These data are in line with meta-analyses showing that acupuncture was more effective than placebo for addressing pain conditions, including headache, knee and back pain, neck disorders, and peripheral osteoarthritis.^{18,19} Similarly,

TABLE 4. TOP 15 CLINICAL SETTINGS

Settings	# of Patients	% of Patients
Family practice	4,013	25.5
Physical medicine & rehabilitation	2,133	13.5
Physical therapist	1,940	12.3
Social worker (provides therapy)	811	5.1
Psychiatry & neurology: Neurology	723	4.6
Physician assistant	670	4.2
Chiropractor	632	4.0
Preventative medicine: Aerospace medicine	583	3.7
General practice	548	3.5
Anesthesiology	526	3.3
Internal medicine	500	3.1
Acupuncturist	455	2.9
Nurse-practitioner: Primary care	435	2.7
Military health care provider/IDC	262	1.7
Specialist/technologist, other	260	1.7
Other	1,270	8.2

IDC, independent duty corpsman

TABLE 5. ACUPUNCTURE TREATMENTS RECEIVED

# of Visits	Active-duty	Nonactive-duty	# of Patients	% of Patients
1	4,031	2,294	6,325	40.1
2–5	4,325	2,122	6,447	40.9
6–10	1,377	646	2,023	12.8
11–20	458	289	747	4.7
21+	108	111	219	1.4
Total	10,299	5,462	15,761	100.0

the 8.7% of patients receiving treatment for mental health issues reflect the military's focus on that specific area, and are in line with a meta-analysis suggesting that acupuncture was effective for treatment of PTSD.²⁰ However, the remaining 4% of patients received treatment for various issues including circulatory, respiratory and metabolic disorders, neoplasms, and concerns of pregnancy, which are not supported by the same quality of evidence for effectiveness.

Several demographic groups were overrepresented in the data set. Female personnel comprised 15.1% of the total active-duty forces in 2014,²¹ but received ~26.5% of acupuncture treatments. Asians and Pacific Islanders comprised a total 5.5% of the active-duty forces²¹ and received 7.7% of the acupuncture treatments. Among services, Army personnel comprised 38% of the active-duty forces, and received 53.8% of the acupuncture. Additionally, demographic differences were found between active- and nonactive-duty beneficiaries in their use of acupuncture, with greater use among the active-duty population in males ages 25–34, in contrast to females ages 45–64 in the nonactive-duty population.

Another major finding was the provision of acupuncture by physician extenders, such as corpsmen or physician assistants. The use of physician extenders is a current goal of the MHS, as published literature shows this increases the number of providers available to care for patients, thus increasing patient access, while freeing physicians to care for patients requiring more-intensive treatment.²² This makes sense in the context of acupuncture as an alternative to opioids given that the delivery of acupuncture is not federally restricted to physician providers, as is the case for prescribing opioids. However, the findings of acupuncture practiced by mental-health professionals (7.1%) and in social-work settings (5.1%) are worthy of further investigation.

Strengths and Limitations of the Study

A strength of this study was the specificity of its findings. Previous studies have addressed the numbers of MTFs providing acupuncture and, to a lesser extent, the broad categories of conditions for which it is prescribed.^{12,13} However, the previous studies did not identify provider types or address diagnoses at the patient level. This study,

involving 15,761 recipients of acupuncture, builds a solid foundation for future analysis.

Several limitations must be acknowledged, including issues with granularity, coding, and availability of data. There are multiple acupuncture techniques used in the MHS, including dry needling, scalp acupuncture, moxibustion, electrical stimulation, tendinomuscular acupuncture, modified Chinese acupuncture, and the meridian-based French technique, along with auricular BFA as mentioned in the Introduction.¹⁴ However, the administrative data are not sufficiently granular to distinguish among these modalities, and certain nonneedle modalities lack specific CPT codes as described in Materials and Methods. Combined with the 9.5% of patients with nonspecific diagnoses, this indicates the need for more-effective coding. It is also not clear from the data if provision of acupuncture for conditions such as pregnancy or neoplasms represents primary, adjunct, or alternative care for these conditions.

A similar issue hampered the full assessment of providers. Although administrative data reveal the number of MTFs providing acupuncture, the data do not reveal the number of practitioners at each facility, nor the techniques the practitioners are able to administer. This limits discussion about accessibility; for instance, whether provider availability might cause prioritization of active-duty over nonactive-duty patients, or whether provider training might limit the conditions for which patients could receive acupuncture—potentially causing those factors to be overrepresented in the data set. Additionally, the HIPAA taxonomy codes, used to categorize practitioners, are not sufficiently granular to distinguish between degrees of licensure; for instance, *medical acupuncturist* versus *licensed acupuncturist (LAc)*. Finally, the total number of acupuncturists practicing in the MHS is unreported, as services apparently did not track this data at the time of this research.

This study also did not capture acupuncture sought outside of the MHS and privately funded. Although acupuncture is provided in the direct-care system at MTFs, TRICARE does not authorize its payment in the purchased-care system. Care outside of the MTF must be privately paid for and is not captured in the MDR; therefore, the true prevalence among service members and their beneficiaries could be underestimated. Finally, this descriptive study left many correlations unexplored, such as number of visits with comorbidities, or potential reduction of opioid use by patients receiving acupuncture. Further research is necessary to answer these questions.

CONCLUSIONS

Acupuncture within the MHS is largely consistent with pain control among an active-duty population. The presence of other diagnoses, and of ages outside the active-duty range, suggest a growing acceptance of acupuncture for wider use, potentially as an adjunct treatment for multiple

conditions. Similarly, the provision of care by physician extenders is consistent with current efforts to increase access within the MHS. This study identifies the patterns of acupuncture use by MHS beneficiaries as well as gaps in knowledge that hamper full investigation and serve as potential roadblocks to access. Further research is needed to address these factors.

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AUTHOR DISCLOSURE STATEMENT

The authors declare that no competing financial interests exist.

REFERENCES

1. Treede R-D, Rief W, Barke A, et al. A classification of chronic pain for ICD-11. *Pain*. 2015;156(6):1003–1007.
2. Lew HL, Otis JD, Tun C, Kerns RD, Clark ME, Cifu DX. Prevalence of chronic pain, posttraumatic stress disorder, and persistent postconcussive symptoms in OIF/OEF veterans: Polytrauma clinical triad. *J Rehabil Res Dev*. 2009;46(6):697–702.
3. Toblin RL, Quartana PJ, Riviere LA, Walper K, Hoge CW. Chronic pain and opioid use in US soldiers after combat deployment. *JAMA Intern Med*. 2014;174(8):1400–1401.
4. Butler LD, Linn BK, Meeker MA, McClain-Meeder K, Nochajski TH. “We Don’t Complain About Little Things”: Views of veterans and military family members on health care gaps and needs. *Mil Behav Health*. 2015;3(2):116–124.
5. New Hampshire Legislative Commission on PTSD and TBI. (2016). About Stigma. Online document at: <http://askthequestion.nh.com/resources/about-stigma/> Accessed May 4, 2016.
6. Nicholson, B. Responsible prescribing of opioids for the management of chronic pain. *Drugs*. 2003;63(1):17–32.
7. Jonas WB, Schoomaker EB. Pain and opioids in the military: We must do better. *JAMA Intern Med*. 2014;174(8):1402–1403.
8. Goertz C, Marriott, BP, Finch MD, et al. Military report more complementary and alternative medicine use than civilians. *J Altern Complement Med*. 2013;19(6):509–517.
9. Prince PD. Army Medicine Officials Seek to Evolve Warrior Care. U.S. Army, June 24, 2011. Online document at: www.army.mil/article/60455/ Accessed May 4, 2016.
10. Office of the Army Surgeon General. Pain Management Task Force Report: Providing a Standardized DoD and VHA Vision and Approach to Pain Management to Optimize the Care for Warriors and Their Families. 2010. Online document at: www.dvcipm.org/files/reports/pain-task-force-final-report-may-2010.pdf Accessed May 4, 2016.
11. Wieland LS, Manheimer E, Berman BM. Development and classification of an operational definition of complementary and alternative medicine for the Cochrane Collaboration. *Altern Ther Health Med*. 2011;17(2):50–59.
12. Petri RP Jr, Delgado RE. Integrative medicine experience in the U.S. Department of Defense. *Med Acupunct*. 2015;27(5):328–334.
13. U.S. Defense Health Agency (DHA). Integrative Medicine in the Military Health System: Report to Congress. Washington, DC: DHA, 2014. Online document at: <http://health.mil/Reference-Center/Reports?query=integrative+medicine> Accessed May 4, 2016.
14. Madsen C, Vaughan M, Koehlmoos T. Use of integrative medicine in the United States Military Health System. *Evid Based Complement Alternat Med*. 2017;2017:9529257.
15. TRICARE. About Us—Number of Beneficiaries. Online document at: www.tricare.mil/About/Facts/BeneNumbers Accessed February 24, 2017.
16. TRICARE. About Us—Health and Dental Facilities. Online document at: www.tricare.mil/About/Facts/Facilities Accessed February 24, 2017.
17. Andridge RR, Little RJA. A review of hot deck imputation for survey non-response. *Int Stat Rev*. 2010;78(1):40–64.
18. Hopton A, MacPherson H. Acupuncture for chronic pain: Is acupuncture more than an effective placebo? A systematic review of pooled data from meta-analyses. *Pain Pract*. 2010;10(2):94–102.
19. Lee MS, Ernst E. Acupuncture for pain: An overview of Cochrane reviews. *Chin J Integr Med*. 2011;17(3):187–189.
20. Wahbeh H, Senders A, Neuendorf R, Cayton J. Complementary and alternative medicine for post-traumatic stress disorder symptoms: A systematic review. *J Evid Based Complement Alternat Med*. 2014;19(3):161–175.
21. Military One Source. 2014 Demographics: Profile of the Military Community. Office of the Deputy Assistant Secretary of Defense, 2014. Online document at: <http://download.militaryonesource.mil/12038/MOS/Reports/2014-Demographics-Report.pdf> Accessed February 24, 2017.
22. Auerbach DI, Chen PG, Friedberg MW, et al. Nurse-managed health centers and patient-centered medical homes could mitigate expected primary care physician shortage. *Health Affairs*. 2013;32(11):1933–1941.22.

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