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The Incidence of Low Back Pain in Active Duty United States Military Service Members

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Study Design. Epidemiological study.

Objective. To investigate the incidence and risk factors for developing low back pain in active duty military population to include age, sex, race, and rank, and military service.

Summary of Background Data. Low back pain is among the most common musculoskeletal conditions worldwide and is estimated to affect nearly two-thirds of the US population at some point in their lives. Low back pain is a multifactorial disease and many risk factors have been implicated including age, race, sex, and marital status.

Methods. A query was performed using the US Defense Medical Epidemiology Database (DMED) for the International Classification of Diseases, Ninth Revision, Clinical Modification code for low back pain (724.20). 13,754,261 person-years of data were investigated. Multivariate Poisson regression analysis was used to estimate the rate of low back pain per 1000 person-years, whereas controlling for sex, race, rank, service, age, and marital status.

Results. The overall unadjusted incidence rate of low back pain was 40.5 per 1000 person-years. Women, compared with men, had a significantly increased incidence rate ratio for low back pain of 1.45. The incidence rate ratio for the 40+ age group compared with the 20 to 29 years of age group was 1.28. With junior officers as the referent category, junior- and senior-enlisted rank groups had increased incidence rate ratio for low back pain, 1.95 and 1.35, respectively. Each service, when compared with the Marines as the referent category, had a significantly increased incidence rate ratio of low back pain: Army: 2.19, Navy: 1.02, and Air Force: 1.54. Compared with single service members, significantly increased incidence rate ratio for low back pain were seen in married service members: 1.21.

Conclusion. Female sex, enlisted rank groups, service in the Army, Navy, or Air Force, age greater than 40 years, and a marital status of married were all risk factors for low back pain.

Key words: epidemiology, low back pain, military, demographic.
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Low back pain is among the most common musculoskeletal conditions worldwide and is estimated to affect up to 85% of the US population at some point in their lives.[1] It is a significant cause of disability in the working population and carries a substantial economic impact with an estimated annual cost of $28 billion in the United States alone.[2,3] Because of the impact it has on a significant portion of the general population, it has been the subject of numerous studies to identify populations at greater risk as well as factors that contribute to the development of this condition.

Although low back pain is such a common condition, it remains poorly understood. It is a complex and multifactorial condition with many contributing variables to include psychosocial factors[4–6] and occupational factors,[7,8] and demographic factors. Demographic factors that have been suggested as risk factors for development of low back pain include age,[9–12] sex,[10,12–14] marital status,[15,16] and race.[17,18]

The US Armed Forces represents a physically active population of male and female service members with generally high occupational demands. These patients are also screened at the initial military entry examination for preexisting spinal conditions. Findings of any preexisting spinal abnormalities exclude patients from entry to active duty military service. Once in military service, these patients must meet the standards of a semiannual physical fitness test and height/weight requirements and must also participate in organized physical fitness training programs. The purpose of our study is to evaluate the incidence and demographic risk factors associated with new onset low back pain in the US Armed Forces service members.

MATERIALS AND METHODS

The military maintains large medical databases, making it an excellent population in which to study musculoskeletal disorders such as low back pain. One such database is the Defense Medical Epidemiology Database (DMED), which compiles

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International Classification of Diseases, Ninth Revision (ICD-9), coding information for every patient encounter in a military treatment facility. The diagnoses in the DMED are made by either a physician or a physician extender. This database also maintains the total number of service members on active-duty updated on a monthly basis. It is also used to calculate the person-years of exposure.; and contains patient demographic and military specific-data. DMED is a frequently updated database that is able to track military service members as they move throughout the world. It also includes outsourced (nonmilitary) outpatient healthcare facilities providing care to active-duty service members. It has been used previously to provide information on various musculoskeletal conditions.[19–25]

To determine the total number of patients with low back pain, we queried the ambulatory DMED system for the years 1998 to 2006 using the *ICD-9* CM code 724.20. The *ICD-9* code of lumbago is easily diagnosed by a variety of health care providers without concern for diagnostic criteria that is found in other similar codes. To maintain homogeneity of diagnoses, this was the only code assessed in this study. Ambulatory encounters were limited to a "first occurrence," which included only the first time the diagnosis was made in the ambulatory setting for a particular patient. This excluded repeat coding of a single episode of acute low back pain by multiple providers as well as multiple visits for chronic low back pain. In patients with multiple separate episodes of acute low back pain, however, only the first occurrence was then captured and enables a true calculation of incidence. This did not exclude those with prior episodes of low back pain before entering into military service. We then categorized the results by sex, race, age, rank, military service, and marital status. Race data are routinely obtained from the Defense Manpower Data Center, which compiles service members' self-report of race with the following options: white, black, Hispanic, Alaskan Native/American Indian, Asian/Pacific Islander, and others. DMED classifies these categories into three larger groups: white, black, and other. Mixed race individuals were classified according to self-report. The age categories used were less than 20, 20 to 24, 25 to 29, 30 to 34, 35 to 39, and 40+. The rank categories used were junior enlisted (E1–E4), senior enlisted (E5–E9), junior officers (O1–O3), and senior officers (O4–O9). The military service categories used were Army, Navy, Air Force, and Marines. Marital status is classified as single, married, or other as determined by self-report. DMED does not compile height or weight data on service members, so this information was not available for analysis. The database was also queried for the total number of service members on active-duty during the study time period, and the results were categorized by sex, race, age, rank, service, and marital status.

Statistical Methods

For the incidence of low back pain, the outcome measure was determined as the incidence rate per 1000 person-years. A person-year represents 1 year of active duty time in which a service member is exposed to the risk factors for low back pain regardless of occurrence of low back pain. Incidence rate represents the new onset of low back pain within the study population. We used multivariate Poisson regression to estimate the rate of low back pain per 1000 person-years by sex, race, age, rank, service, and marital status (unadjusted rates). In addition, using Poisson regression, we computed rate ratios for sex, using men as the referent, and analyzing for differences in race, age, rank service, and marital status between men and women. Rate ratios were also calculated for race (using white as the referent category), age (using younger than 20 years as the referent), rank (using junior officers as the referent category), service (using the Air Force as the referent category), and marital status (using single as the referent), all of which were controlled for other covariates. The referent category in each group was chosen on the basis of the subgroup with the lowest incident rate for previously studied musculoskeletal disorders.[26] This study received institutional review board approval. No external funding was received for this study.

RESULTS

A total of 557,059 cases of low back pain were documented in our population at risk of 13,754,261 person-years. The overall incidence rate of low back pain in our population was 40.5 per 1000 person-years. The unadjusted incidence rate of low back pain was 58.3 per 1000 person-years among women and 37.6 per 1000 person-years among men. Women, when compared with men, had a significantly increased incidence rate ratio for low back pain of 1.45 (95% confidence interval [CI]: 1.44–1.46). When examining the age subcategories, it was found that the incidence rate ratio for women, when compared with men, was statistically significant at all age subcategories. The incidence rates for men and women by age group are listed in Table 1.

The unadjusted incidence rate for low back pain was 38.9 among whites, 47.4 among blacks, and 38.5 among others per 1000 person-years. Blacks and whites, when compared with others, had significantly increased incidence rate ratio for low back pain of 1.10 (95% CI: 1.09–1.11) and 1.05 (95% CI: 1.04–1.06), respectively. When examining the age subcategories, it was found that the incidence rate ratio for whites, when compared with others, was statistically significant at each age subcategory younger than 40 years. The incidence rates for race are presented in Table 2.

We found that older service members had a higher incidence rate for low back pain when compared with younger service members. The highest unadjusted incidence rates were seen in the younger than 20 and 40+ years age groups with incidence rates of 47.9 and 45.7 per 1000 person-years. After adjusting for the other variables, the 40+ age group was found to have the highest adjusted rate of low back pain. The adjusted rate ratio for the 40+ age group compared with the 20 to 29 years age group was 1.28 (95% CI: 1.27–1.29). A complete listing of the age data is given in Table 3.

The unadjusted incidence rate for low back pain among the four rank groups was 45.6 for the junior enlisted, 39.1

TABLE 1. Unadjusted Incidence Rates and Adjusted Incidence Rate Ratios of Low Back Pain Among Members of the US Military, 1998 to 2006, by Age and Sex

	Women			Men			
Age Group	No. of Cases	Person-Years	Unadjusted IR*	No. of Cases	Person-Years	Unadjusted IR*	Adjusted IRR (95% CI)†‡
<20	16,438	193,759	84.8	37,118	924,217	40.2	1.91 (1.87–1.94)
20–29	66,581	1,157,124	57.5	220,438	6,201,487	35.5	1.52 (1.51–1.53)
30–39	22,975	477,043	48.2	129,849	3,406,683	38.1	1.23 (1.21–1.25)
40+	8,877	171,254	51.8	54,783	1,222,694	44.8	1.10 (1.07–1.13)
Overall	114,871	1,969,180	58.3	442,188	11,755,081	37.6	1.45 (1.44–1.46)

**Incidence rate is per 1000 person-years.*

†Male is referent category.

‡Adjusted for age, service, rank, marital status, and race.

IR indicates incidence rates; IRR, incidence rate ratios; CI, confidence intervals.

for the senior enlisted, 27.6 for junior officers, and 33.2 for the senior officers per 1000 person-years. When compared with the junior officers as the referent category, the enlisted rank groups had increased incidence rate ratios for low back pain: junior enlisted: 1.95 (95% CI: 1.92–1.97) and senior enlisted: 1.35 (95% CI: 1.34–1.37). When examining the age subcategories, it was found that the incidence rate ratio for enlisted service members, when compared with junior officers, was statistically significant at all age subcategories. In addition senior officers, when compared with junior officers, had a significantly decreased incidence rate ratio for low back pain of 0.94 (95% CI: 0.92–0.96). The incidence rates for rank groups are presented in Table 4.

The unadjusted incidence rate for low back pain among the four services was 57.0 for the Army, 40.4 for the Air Force, 25.9 for the Navy, and 25.3 for the Marines per 1000 person-years. Each service, when compared with the Marines as the referent category, had a significantly increased incidence rate ratio for low back pain: Army: 2.19 (95% CI: 2.17–2.21), Navy: 1.02 (95% CI: 1.01–1.04), and Air Force: 1.54 (95% CI: 1.52–1.55). When examining the service age subcategories, we found that the incidence rate ratio for the Army and Air Force, when compared with the Marines, was statistically significant at all the age subcategories. The incidence rates for service are presented in Table 5.

When looking at marital status, the unadjusted incidence rate for low back pain was 38.1 among single, 41.3 among married, and 56.4 among other service members per 1000 person-years. Married and other, when compared with single, had significantly increased incidence rate ratios for low back pain of 1.21 (95% CI: 1.20–1.22) and 1.34 (95% CI: 1.32–1.36), respectively. When examining the age subcategories, it was found that the incidence rate ratio for married and other service members, when compared with single, was statistically significant at each age subcategory. The incidence rates for marital status are presented in Table 6.

DISCUSSION

This report represents the largest study of the incidence of low back pain to date, representing 9 years of data in an ethnically and geographically diverse population. Our study found an overall incidence of low back pain in the active duty military population of 40.5 per 1000 person-years. This is comparable to several previous studies on nonmilitary populations that reported incidence rates ranging from 24.2 to 44.7 per 1000 person-years.[27,28] In our population, we identified multiple risk factors for low back pain to include female sex, increasing age, enlisted rank, service in a branch of service other than the Marine Corps and marital status other than single.

Prior studies have shown mixed results regarding the impact of sex as a risk factor for low back pain. Although multiple studies demonstrate an increased incidence of low back pain in women,[6,10,12–14,29,30] other studies demonstrate an equal incidence compared with men.[9,28,31–33] In our study, there was a significantly increased rate of low back pain in female service members compared to male service members. Several factors have been suggested in the literature as potentially contributing to an increased risk of low back pain seen in the female population. These include estrogen exposure,[34] differing responses to pain,[35] and various psychosocial factors. Strowbridge[36] demonstrated a 2.65-fold increased odds ratio for developing acute low back pain as a result of military training and other physical activities by female service members compared with their male counterparts.

Multiple studies have examined race as an epidemiological factor in the incidence of low back pain with varying results. Deyo *et al*[17] found the highest prevalence rate of low back pain in American Indian/Alaskan natives and the lowest rate in Asian Americans. In addition, African Americans demonstrated a lower rate compared with whites. Strine and Hootman[29] found non-Hispanic whites to have a higher prevalence rate of low back pain compared with both African Americans and Hispanics. However, another study found that

TABLE 2. Unadjusted Incidence Rates and Adjusted Incidence Rate Ratios of Low Back Pain Among Members of the US Military, 1998–2006, by Age and Service

Age Group	No. of Cases	Person-Years	Unadjusted IR*	Adjusted IRR (95% CI)#‡
<20				
• Black	12,581	192,533	65.3	1.41 (1.36–1.45)
• White	35,731	78,723	45.4	1.12 (1.09–1.15)
• Other	5,244	138,213	37.9	N/A
20–29				
• Black	63,536	1,339,610	47.4	1.15 (1.14–1.17)
• White	188,783	5,062,976	37.3	1.04 (1.03–1.05)
• Other	34,700	956,025	36.3	N/A
30–39				
• Black	35,801	853,476	41.9	1.01 (0.99–1.03)
• White	100,120	2,598,908	38.5	1.07 (1.05–1.09)
• Other	16,903	431,342	39.2	N/A
40+				
• Black	13,517	259,565	52.1	0.93 (0.90–0.95)
• White	42,615	988,501	43.1	0.90 (0.88–0.92)
• Other	7,528	145,882	51.6	N/A
Overall				
• Black	125,435	2,645,184	47.4	1.10 (1.09–1.11)
• White	367,249	9,437,615	38.9	1.05 (1.04–1.06)
• Other	64,375	1,671,462	38.5	N/A

**Incidence rate is per 1000 person-years.*

†Other is referent category.

‡Adjusted for age, rank, race, marital status and sex.

IR indicates incidence rates; IRR, incidence rate ratios; CI, confidence intervals; N/A, not applicable because this category was used as referent.

non-Hispanic whites had a significantly lower risk when compared with African Americans and Hispanics.[18] In our population, we demonstrated a minimal difference in the risk of low back pain between African Americans and whites that was not determined to be clinically significant.

Increasing age has been commonly cited as a risk factor for low back pain secondary to both cumulative stresses on the spine as well as a potential inherent vulnerability of the aging spine. Age-related changes to the intervertebral discs are well described and include loss of proteoglycans, decreased matrix turnover and synthesis, increased stiffness of the anulus fibrosus, and decreased size of the hydrostatic nucleus.[37] These changes may predispose the aging person to the onset of low back pain. Multiple studies identify an increased prevalence of low back pain in the older patient population; however, this correlation has not been definitively established.[10,12,18,29] The incidence of low back pain in different age groups also

TABLE 3. Adjusted Incidence Rate Ratio of Low Back Pain Among Members of the US Military, 1998–2006, by Age

Age Group	IR*	Adjusted IRR (CI)†
<20	47.9	0.99 (0.97–1.00)
20–29	39.0	N/A
30–39	39.3	0.84 (0.83–0.84)
40+	45.7	1.28 (1.27–1.29)

**Incidence rate is per 1000 person-years.*

†20–29 group used as referent category.

‡Adjusted for sex, service, rank, marital status, and race.

IR indicates incidence rate; IRR, incidence rate ratio; CI, confidence intervals; N/A, not applicable because this category was used as referent.

TABLE 4. Unadjusted Incidence Rates and Adjusted Incidence Rate Ratios of Low Back Pain Among Members of the US Military, 1998–2006, by Age and Rank

Age Group	No. of Cases	Person-Years	Unadjusted IR*	Adjusted IRR (95% CI)†‡
<20				
>E1–E4	53,556	1,117,951	47.9	¶
>O1–O3	0	25	§	N/A
>E5–E9	§	§	§	§
>O4–O9	§	§	§	§
20–29				
>E1–E4	207,284	4,717,443	43.9	1.99 (1.96–2.02)
>O1–O3	15,611	677,586	23.0	N/A
>E5–E9	64,124	1,963,582	32.7	1.41 (1.38–1.43)
>O4–O9	§	§	§	§
30–39				
>E1–E4	16,161	240,792	67.1	2.11 (2.06–2.16)
>O1–O3	17,885	581,890	30.7	N/A
>E5–E9	109,479	2,712,229	40.4	1.35 (1.32–1.37)
>O4–O9	9,299	348,815	26.7	0.87 (0.85–0.89)
40+				
>E1–E4	317	4,273	74.2	1.57 (1.40–1.76)
>O1–O3	3,494	79,856	43.8	N/A
>E5–E9	40,369	791,304	51.0	1.16 (1.12–1.20)
>O4–O9	19,480	518,515	37.6	0.87 (0.84–0.90)
Overall				
>E1–E4	277,318	6,080,459	45.6	1.95 (1.92–1.97)
>O1–O3	36,990	1,339,357	27.6	N/A
>E5–E9	213,972	5,467,115	39.1	1.35 (1.34–1.37)
>O4–O9	28,779	867,330	33.2	0.94 (0.92–0.96)

**Incidence rate is per 1000 person-years.*

†O1–O3 is referent category.

‡Adjusted for age, rank, race, marital status, and sex.

§These age groups are not present in these rank categories.

¶Statistical analysis could not be done for <20 subcategory.

IR indicates incidence rate; IRR, incidence rate ratio; CI, confidence intervals; N/A, not applicable because this category was used as referent.

remains to be fully described with the highest incidence having been reported anywhere from the third decade to between the fifth and seventh decades of life.[28,30,38] Our study demonstrated the highest rate of new onset low back pain in patients older than 40 years.

Our study demonstrated an increased incidence of low back pain in enlisted service members when compared with officers, with the highest rate in junior enlisted service members. The reason for this association is likely multifactorial in nature. Enlisted service members are typically involved in more physically demanding occupations and physical training regimens that place significant strain on the lower back.[39–43] The junior enlisted service members who demonstrated the highest incidence of low back pain comprise the majority of the combat forces in the armed services and are typically involved in the most demanding training and occupational activities. Such activities include the carrying of fighting loads exceeding 40 kg[40] or the repetitive lifting of artillery shells weighing more than 40 kg.[43] Reynolds *et al*[43] found a 57% rate of low back pain in artillerymen over a 1-year period.

TABLE 5. Unadjusted Incidence Rates and Adjusted Incidence Rate Ratios of Low Back Pain Among Members of the US Military, 1998–2006, by Age and Service

Age Group	No. of Cases	Person-Years	Unadjusted IR*	Adjusted IRR (95% CI)†‡
<20				
>Army	33,288	382,235	87.1	3.31 (3.22–3.40)
>Navy	5,873	278,068	21.1	0.81 (0.78–0.84)
>Air Force	8,418	200,208	42.0	1.51 (1.46–1.56)
>Marines	5,976	257,421	23.2	N/A
20–29				
>Army	149,451	2,622,605	57.0	2.35 (2.32–2.38)
>Navy	43,576	1,900,065	22.9	0.97 (0.95–0.98)
>Air Force	67,895	1,720,097	39.5	1.57 (1.55–1.59)
>Marines	26,097	1,115,844	23.4	N/A
30–39				
>Army	68,123	1,368,277	49.8	1.56 (1.53–1.60)
>Navy	30,711	1,068,297	28.7	0.94 (0.92–0.96)
>Air Force	45,318	1,156,926	39.2	1.27 (1.25–1.30)
>Marines	8,672	290,226	29.9	N/A
40+				
>Army	24,751	459,265	53.9	1.30 (1.25–1.35)
>Navy	13,990	388,833	36.0	0.89 (0.86–0.93)
>Air Force	21,581	464,006	46.5	1.12 (1.08–1.17)
>Marines	3,338	81,844	40.8	N/A
Overall				
>Army	275,613	4,832,382	57.0	2.19 (2.17–2.21)
>Navy	94,150	3,635,263	25.9	1.02 (1.01–1.04)
>Air Force	143,212	3,541,237	40.4	1.54 (1.52–1.55)
>Marines	44,083	1,745,335	25.3	N/A

**Incidence rate is per 1000 person-years.*

†Marines is referent category.

‡Adjusted for age, rank, race, marital status and sex.

IR indicates incidence rate; IRR, incidence rate ratio; CI, confidence intervals; N/A, not applicable because this category was used as referent.

Knapik *et al*[41] found a 23% rate of low back injury resulting from a 5-day-road march with a 46-kg fighting load. Darakjy *et al*[26] assessed the injury rate during operational training exercises and found a similar distribution of total injury rate according to rank group with the highest injury rate in junior enlisted and lowest rate in the officers.[26]

Another potential factor affecting the rate of low back pain in these service members is the difference in educational level, which has been shown to influence rates of low back pain.[29] A prerequisite of becoming an officer is obtaining a higher educational level, whereas enlisted service members are only required to have a high-school diploma or graduate equivalency degree. Patients with a bachelor's degree or higher have been shown to have a lower rate of low back pain compared with those with a high-school diploma or less.[17]

Compared with service members in the Marine Corps, a statistically significant increase in low back pain was seen in the other branches of service, with the highest rate of low back pain seen in those serving in the Army. One might expect the Marine Corps to have a higher incidence of low back pain secondary to their increased occupational demands and activity levels; therefore, the lower incidence of low back pain compared to other services was unexpected. The authors postulate that members of the Marine Corps may demonstrate

TABLE 6. Unadjusted Incidence Rates and Adjusted Incidence Rate Ratios (IRR) of Low Back Pain Among Members of the US Military, 1998–2006, by Age and Marital Status

Age Group	No. of Cases	Person-Years	Unadjusted IR*	Adjusted IRR (95% CI)†‡
<20				
Single	48,669	1,039,202	46.8	N/A
Married	4812	78,367	61.4	1.20 (1.17–1.24)
Other	75	382	196	2.31 (1.84–2.90)
20–29				
Single	148,921	4,109,813	36.2	N/A
Married	128,316	3,080,081	41.7	1.21 (1.20–1.22)
Other	9782	168,717	58.0	1.42 (1.39–1.45)
30–39				
Single	18,543	533,913	34.7	N/A
Married	122,099	3,107,525	39.3	1.16 (1.14–1.18)
Other	12,182	242,288	50.3	1.26 (1.23–1.29)
40+				
Single	4611	115,253	40.0	N/A
Married	53,027	1,192,312	44.5	1.07 (1.04–1.11)
Other	6,022	86,383	69.7	1.47 (1.41–1.53)
Overall				
Single	220,744	5,798,181	38.1	N/A
Married	308,254	7,458,285	41.3	1.21 (1.20–1.22)
Other	28,061	497,770	56.4	1.34 (1.32–1.36)

**Incidence rate is per 1000 person-years.*

†Single is referent category.

‡Adjusted for age, rank, race, and sex.

IR indicates incidence rate; IRR, incidence rate ratio; CI, confidence intervals; N/A, not applicable because this category was used as referent.

higher levels of physical fitness that protect them from the increased rigors of their service in the Marines.

Marital status is a variable that has been associated with the incidence of low back pain. In our study, there was a statistically significant increased risk for development of low back pain when examining the incidence rate ratio for service members in the married or other group compared with single service members: 1.21 (95% CI: 1.20–1.22) and 1.34 (95% CI: 1.32–1.36), respectively. A 2004 CDC report found demonstrated individuals younger than 65 years with an increasing prevalence of low back pain in the following groups: single adults, 24.7%; married adults, 27.6%; and divorced or separated individuals, 32.2%.[15] This has also been demonstrated in multiple other studies as well.[12,16,17,29] It is unclear why marital status has an effect on the incidence of low back pain; however, this is likely related to the psychosocial aspect of this disorder. Marital dissolution is associated with decreased overall health, and an increased risk of depression, anxiety, and emotional distress.[44–47] These same psychological factors are associated with the development of low back pain.[4–6,48] The reason for the increased risk in married individuals is not as clear. These individuals generally demonstrate improved overall health compared with other marital groups and typically are considered to have more psychosocial and economic support,[49–51] which should have a protective effect. This complex interaction of physical and psychosocial factors highlights the complex nature of low back pain and provides areas for future research.

The main strength of our report is the large number of individuals captured within our study population, representing the largest report on the incidence of low back pain to date. In addition, the study population is contained within a closed health system, making it unlikely for patients to be diagnosed with a condition without being captured in the database. Despite these strengths, our study has multiple limitations inherent to any large database study. First, multiple physicians evaluated and coded the patient encounters, which may decrease the accuracy of the diagnosis of low back pain.

As the majority of clinic visits for low back pain are made to general practitioners, we believe that the familiarity with the presentation and diagnosis of low back pain is quite high. Second, our subjects were all active-duty service members, which may limit the ability of the data to be applied to the general population.

Our study demonstrated multiple risk factors for low back pain in the active duty military population. Female sex was found to be a significant risk factor for developing low back pain, as was being currently or previously married. In terms of military factors, we found a significantly higher rate in the enlisted rank groups and those service members serving in the Army. The identification of these demographic risk factors for low back pain may be used to identify high-risk groups within general physically active populations to implement preventative measures. These preventative measures may include educational programs, core strengthening regimens, and targeted workplace interventions. Further prospective studies would be helpful to better understand the effect of high activity levels and occupational demands on the development of low back pain within an ethnically diverse population.

➢ Key Points

- ❑ Low back pain is a multifactorial disease with multiple demographic risk factors.
- ❑ Similar rates of low back pain were identified in the active duty military population as compared with previous studies on civilian populations.
- ❑ Females were found to have a significantly increased rate of low back pain in the active duty population.
- ❑ Increasing age was found to be a significant risk factor for low back pain.
- ❑ Higher ranking individuals and service members in the Marine Corps were found to have a significantly lower rate of low back pain.

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