

Gender Differences in Health Care Utilization Among Veterans with Chronic Pain

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BACKGROUND: Previous research reports that 48% of veterans regularly experience and express concern over pain. Outpatient service use is higher for veterans with pain than for veterans without pain. Our study objective was to identify differences in outpatient utilization between men and women veterans with chronic pain.

METHODS: We identified all men and women veterans at the Durham Veterans Affairs Medical Center in fiscal year (FY) 2002 between the ages of 21 and 60 that had two visits for the same pain location at least 6 weeks apart as determined by ICD-9 coding. Men and women were age-matched at a 2:1 ratio. We then compared the number of outpatient visits between genders in FY 2003.

RESULTS: We identified 406 female and 812 male veterans. The mean number of clinic visits for women was 25.2 (SD 30.2) and for men 17.6 (SD 24.1). After adjusting for multiple pain sites, psychiatric diagnoses, age, and comorbidities, women veterans had a 27% higher rate of outpatient visits than men (incidence rate ratio [RR] 1.27, 95% confidence [CI] 1.15 to 1.41). Specifically, women had higher rates of visits to primary care (RR 1.36, 95% CI 1.24 to 1.50), physical therapy (RR 1.67, 95% CI 1.20 to 2.33), and other clinics (RR 1.28, 95% CI 1.14 to 1.44), and had a higher rate of visits to address pain (RR 1.15, 95% CI 1.02 to 1.30) than men.

CONCLUSIONS: This is the first study to examine gender differences in chronic pain and utilization in the veteran population. Women veterans with chronic pain may need more resources to adequately manage chronic pain conditions as well as associated comorbidities and psychiatric disease.

KEY WORDS: women veterans; chronic pain; health care utilization; mental health.

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BACKGROUND

Pain is one of the most common reasons patients visit their physicians. Estimates of the prevalence of chronic pain in the general medical population range from 20 to 60%¹ depending on the definition of chronic pain and characteristics of sample populations. It has been estimated that 80% of all office visits each year are for pain-related issues.² A recent study² reported 48% of veterans experienced pain regularly and expressed concern over their pain. Use of outpatient medical services in these veterans was significantly higher than those that did not report chronic pain.

There is a growing focus on gender differences in chronic pain, including responses to opioid analgesia, responses to current pain in the context of previous pain experience, and the effect of reproductive hormones.³ From the Danish National Health Surveys, it was found that women with chronic pain had significantly more primary care contacts than men with chronic pain.⁴ Although the Veterans Health Administration has made chronic pain a research priority,⁵ gender differences in veterans with chronic pain have not yet been examined. Because of a strong association between chronic pain and psychiatric conditions,⁶ including posttraumatic stress disorder,^{7–9} women veterans may be at increased risk for chronic pain syndromes compared to men because of high rates of sexual trauma and depression.¹⁰

We set out to examine differences in outpatient utilization between men and women veterans with chronic pain at the Durham Veterans Affairs Medical Center (VAMC). This information may allow for better understanding of resource allocation in the management of chronic pain across gender. Based on previous studies of utilization,^{11,12} we hypothesized that female veterans with chronic pain would have higher rates of total outpatient visits compared to an age-matched sample of male veterans with chronic pain. We also hypothesized that female veterans would have a greater number of visits to address pain conditions and a greater number of visits to primary care, psychiatry, physical therapy, and pain clinics in general than men.

METHODS

We performed a retrospective secondary data analysis to identify all men and women veterans at the Durham VAMC with chronic pain in fiscal year (FY) 2002. The Veterans Affairs (VA) System FY 2002 begins on October 1, 2001 and ends the

following September 30, 2002. All women with chronic pain were selected using the VA Outpatient Care (OPC) file records and a random age-matched population of men with chronic pain was selected from this same source. The Durham VAMC institutional review board approved the study protocol.

Study Population

We limited the sample to the Durham VAMC because it is one of eight Comprehensive Women Centers with a broad range of services for women. Because there is variability among the services offered at each of these women's centers, we could not be certain that women veterans were utilizing community physicians to a greater degree, and therefore would not be accounted for in the VA databases.

Our first step was to identify all men and women veterans at the Durham VAMC in FY 2002 between the ages of 21 and 60 that had two visits for the same pain location at least 6 weeks apart as determined by ICD-9 coding. Veterans over age 60 were excluded because only a small percentage of women veterans using the VA health care system are over 60. Women and men who died in 2002 or 2003 were excluded.¹³ We kept all remaining women ($n=406$) and then identified a random sample of men that were matched in age (± 5 years) to the women for a 2:1 ratio^{14,15} as women are disproportionately underrepresented in the VA clinic populations. Our goal for age matching was to identify a sample of men that should have similar utilization rates to the sample of women because age has been identified as a predictor of utilization.^{16,17}

Criteria for Chronic Pain

The criterion we used for chronic pain was two visits for the same pain condition at least 6 weeks apart. It is based on several sources including VA guidelines.¹⁸⁻²⁰ Chronic pain is defined as a pain that lasts beyond the ordinary duration of time that an insult or injury to the body needs to heal. This is commonly thought of as 4 to 6 weeks, although others have chosen 3 months as the dividing line between acute and chronic pain.²⁰ The ICD-9-CM book²¹ was manually reviewed for all codes related to pain. Two of the authors (S.K. and L.A. B.) came to consensus on grouping these codes into 15 general categories: abdominal, back, bone spur, chest, generalized, headache, jaw, joint, limb, neck, pelvic, phantom limb, scrotum, and trigeminal and varicose vein pain.

Outcome Variables. Visit data from FY 2003 were collected for this sample through the VA OPC. This included total clinic visits, psychiatry visits, primary care visits, pain clinic visits, and physical therapy visits as well as visits made to address a pain condition. Each clinic stop was counted as an individual outpatient visit. Other visits include laboratory, radiology, nursing as well as other specialty visits. Emergency department visits were not included in this analysis.

Model Covariates

Known predictors of higher rates of outpatient visits in populations with chronic pain include gender, age, psychological distress, comorbidities, and pain severity (as measured by number of pain sites and pain intensity).^{16,17,22-24} Age,

psychiatric disease, comorbid conditions, as well as number of pain sites were incorporated in the adjusted model. Rating of pain severity was not available for inclusion in our adjusted model.

The number of chronic pain conditions, based on two visits at least 6 weeks apart, was incorporated in the model as a dichotomous variable (single vs multiple) because of the distribution. In our analysis, age and the Charlson comorbidity index score^{25,26} were treated as continuous variables. The Charlson comorbidity index was originally developed for medical record abstraction predicting outcomes of hospitalizations and mortality and identifies 19 medical conditions.²⁵ The Charlson score is the sum of weights assigned to each condition (from 1 to 6). The index was adapted for use with databases that utilize ICD-9 CM codes,²⁶ and has previously been validated as a predictor of increased health service use.²⁷ Charlson scores were calculated for each of the subjects from FY 2003 outpatient data.

To measure mental health conditions in this population, we examined major psychiatric diagnoses. Specifically, we identified whether participants had a visit in FY 2003 in which the following were coded: depression, PTSD, substance abuse, or other psychiatric condition. The psychiatric diagnoses variables were coded as dichotomous variables: "yes" if condition present and "no" if condition not present (i.e., separate dichotomous variables for each of the psychiatric conditions).

Previous studies have also suggested that pain at certain sites may be an important predictor of visits to a physician.¹⁶ Specific pain sites (with more than 5 subjects per category) were examined as possible covariates in predicting the outcome of total visits. These included joint, back, headache, abdominal, limb, pelvic, bone spur, and chest pain.

Data Analysis

Descriptive statistics were conducted for the number and types of chronic pain conditions, number of clinic visits made, cancer diagnosis, and service connection status.

We used chi-squared tests to examine gender differences in the proportion of subjects with specific pain conditions. Wilcoxon rank sum tests were used to compare unadjusted visit data from FY 2003 between male and female veterans.

To examine the significance of gender after adjustment for other covariates, we fitted a generalized linear model to the outpatient visit data.²⁸ Generalized linear models for modeling visit or count data include Poisson and negative binomial regression models. Negative binomial regression is a generalization of the Poisson regression model and is appropriate when data are overdispersed (variance greater than the mean). Overdispersion can generate underestimates of standard errors in Poisson models and lead to overstatement of statistical significance. Because our data appeared to be overdispersed, we fit a negative binomial regression model to the total outpatient clinic visit data and adjusted for important covariates. Covariates in the models were as described above: age, multiple pain sites (vs a single site), Charlson comorbidity score, and psychiatric diagnoses. Including specific pain site locations did not significantly improve the fit of the model; therefore, we did not include any of the individual pain site locations in the final model.

As a secondary analysis we followed the same modeling strategy described above with the outcome of visits to address

Table 1. Sample Characteristics

Characteristics	Female veterans	Male veterans
Number of subjects	406	812
Mean Age (SD)	42.6 (8.6)	42.6 (8.5)
Malignant cancer in FY* 2002 or FY 2003 (%)	11 (2.7)	22 (2.7)
Mean Charlson comorbidity score (SD)	0.5 (1.0)	0.5 (1.1)
Psychiatric diagnoses (%) [†]	223 (54.9)	379 (46.7)
Depression diagnosis (%) [†]	152 (37.4)	206 (25.4)
PTSD diagnosis (%) [†]	101 (24.9)	132 (16.3)
Substance abuse diagnosis (%)	62 (15.3)	146 (18.0)
Other psychiatric diagnosis (%) [†]	111 (27.3)	162 (20.0)
Service connected (%)	308 (75.9)	587 (72.3)
Chronic pain conditions		
Joint pain (%) [†]	181 (44.6)	416 (51.2)
Back pain (%) [†]	95 (23.4)	331 (40.8)
Headache (%) [†]	89 (21.9)	62 (7.6)
Abdominal pain (%) [†]	45 (11.1)	26 (3.2)
Limb pain (%) [†]	41 (10.1)	41 (5.1)
Pelvic pain (%) [†]	18 (4.4)	8 (1.0)
Chest pain (%)	12 (3.0)	28 (3.5)
Bone spur pain (%)	11 (2.7)	13 (1.6)
Number of pain sites		
One	335 (82.5)	704 (86.7)
Two	59 (14.5)	98 (12.1)
Three	9 (2.2)	10 (1.2)
Four	3 (0.7)	0

Less than 5 patients were identified in each of the following categories: scrotum pain, jaw pain, trigeminal pain, phantom limb pain, varicose vein pain, neck pain, and general pain.

*FY represents fiscal year beginning October of the previous year and ending the following September.

[†]Statistically significant difference $P < .05$ based on the chi-square statistic.

a pain condition in FY 2003 as well as visits made to primary care, psychiatry, pain clinic, physical therapy, and other outpatient specialty clinics. All analyses were performed using SAS version 8.2 (SAS Institute, Cary, NC).

RESULTS

We identified 406 female veterans and 812 male veterans for this study. The mean age of both groups was 42.6 years (SD

8.6 for women and 8.5 for men). In both men and women, 3.0% of the sample populations had a diagnosis of a malignant condition in 2002 or 2003, determined by ICD-9 visit coding. Almost 76% of women and 72% of men had some service connection status associated with a current medical condition. With regard to psychiatric comorbidity, women had a significant higher prevalence of depression, PTSD, and other psychiatric conditions compared to men (Table 1).

The most common chronic pain conditions were joint pain, back pain, headaches, limb pain, and abdominal pain (Table 1). Women had a significantly higher prevalence of headache, abdominal, and limb pain than men, and men had a significantly higher prevalence of back pain and joint pain than women. Chronic chest pain was similar in both samples. Among the women, 82.5% met the sample criteria for a single pain site, and 17.5% had multiple pain sites. In comparison, 86.7% of men met the sample criteria for a single pain site, and 13.3% had multiple pain sites.

Details of visits made by men and women seen in primary care, psychiatry, and pain and physical therapy clinics are given in Table 2. In comparing the unadjusted number of total outpatient visits made in FY 2003 between women and men, the mean number of total clinic visits for women veterans was 25.5 (SD 30.2) compared to 17.6 (SD 24.1) for men. The difference in median clinic visits between women and men was significant (17 vs 11, respectively, $P < .001$). The mean number of outpatient visits made to specifically address pain was 4.8 (SD 6.2) for women and 3.8 (SD 4.3) for men. Although the median number of visits made to specifically address a pain condition was equivalent between men and women, women systematically had a higher number of pain-related visits. (median 3, lowest quartile 1, highest quartile 6 vs median 3, lowest quartile 1, highest quartile 5; $P = .03$).

After adjusting for covariates, female veterans had a 27% higher rate of outpatient visits than male veterans (incidence rate ratio [RR] 1.27, 95% confidence interval [CI] 1.15 to 1.41, $P < .001$). Female veterans also had a 36% higher rate of visits to primary care than male veterans (Table 3). Female veterans had a 15% higher rate of outpatient visits to specifically address pain concerns than male veterans. Difference between gender in rates of psychiatry visits was not statistically significant.

Table 2. Comparison of Outpatient Clinic Visit Utilization

Outpatient clinic visits FY 2003*	Percent [†] of women with ≥ 1 clinic visit	Percent of men with ≥ 1 clinic visit	Median visits by women (Q1, Q3) [‡]	Median visits by men (Q1, Q3) [‡]	Unadjusted comparison P value [§]
Primary care	89.4	82.6	4 (2,6)	2 (1,4)	<0.0001
Total psychiatry	41.9	28.0	0 (0,3)	0 (0,1)	<0.0001
Psychiatry/psychology	40.9	25.4	0 (0,3)	0 (0,1)	<0.0001
Substance abuse	2.2	3.0			0.5752
Military sexual trauma	2.7	0			<0.0001
PTSD	2.7	4.6			0.1587
Physical therapy	21.2	18.6	0 (0,0)	0 (0,0)	0.2452
Pain clinic	15.0	17.0	0 (0,0)	0 (0,0)	0.3958
Other outpatient visits (specialty clinics)	93.6	90.3	10 (4, 21)	7 (3,15)	<0.0001
Total visits for pain	84.5	82.9	3 (1,6)	3 (1,5)	0.0362
Total visits for 2003 [¶]	96.3	93.2	17 (8,32)	11 (5,23)	<0.0001

*FY 2003 is fiscal year 2003 beginning October 1, 2002 through September 30, 2003.

[†]Percent based on a total of 406 women and a total of 812 men.

[‡]Q1 represents lower quartile, Q3 represents higher quartile.

[§]Distributions of number of visits compared using the Wilcoxon rank sum test.

¶For substance abuse, military sexual trauma, and PTSD, because of only few subjects attending these clinics, a Pearson chi-square test was performed to examine relationship between sex and attending the clinic at least once in FY 2003. Exact P values are given.

[¶]No visits recorded in FY 2003 for 15 women and 55 men.

Table 3. Adjusted Incidence Rate Ratios (95% CI) for Outpatient Visit Comparison of Veterans with Chronic Pain

Variable	Primary care	Psychiatry	Physical therapy	Pain clinic	Other clinics	Visits for pain	Total visits
Female	1.36 (1.24, 1.50)	0.90 (0.70, 1.15)	1.67 (1.20, 2.33)	0.79 (0.53, 1.15)	1.28 (1.14, 1.44)	1.15 (1.02, 1.30)	1.27 (1.15, 1.41)
Multiple pain sites	1.09 (0.96, 1.23)	1.18 (0.87, 1.60)	0.54 (0.33, 0.87)	1.85 (1.15, 3.00)	1.08 (0.93, 1.26)	1.24 (1.05, 1.45)	1.09 (0.95, 1.25)
Depression diagnosis	1.39 (1.25, 1.54)	7.39 (5.84, 9.36)	1.61 (1.08, 2.38)	1.51 (0.99, 2.28)	1.47 (1.30, 1.67)	1.59 (1.38, 1.82)	1.64 (1.46, 1.83)
PTSD diagnosis	1.23 (1.09, 1.39)	6.62 (5.13, 8.54)	0.98 (0.63, 1.53)	1.27 (0.79, 2.06)	1.42 (1.23, 1.65)	1.13 (0.97, 1.31)	1.56 (1.37, 1.78)
Substance abuse diagnosis	1.19 (1.06, 1.34)	3.04 (2.31, 4.02)	0.86 (0.55, 1.34)	1.45 (0.91, 2.30)	1.41 (1.22, 1.63)	1.19 (1.03, 1.39)	1.41 (1.24, 1.60)
Other psychiatric diagnosis	1.16 (1.04, 1.30)	4.75 (3.71, 6.07)	1.24 (0.81, 1.91)	1.06 (0.67, 1.67)	1.49 (1.30, 1.72)	1.22 (1.05, 1.41)	1.52 (1.34, 1.72)

Adjusted for age, Charlson comorbidity score, multiple pain sites (yes/no), and specific psychiatric diagnoses (yes/no: depression, PTSD, substance abuse or other) using negative binomial regression models.
CI = confidence interval.

Female veterans also had a 67% higher rate of physical therapy visits and a 28% higher rate of other clinic visits, this included visits to specialists, than male veterans. Veterans with multiple pain sites compared to those with a single pain site had higher rates of pain-related visits and pain clinic visits but lower rates of physical therapy. Moreover, veterans with a psychiatric diagnosis (e.g., depression), in general, had higher rates of total and pain related visits compared to those without the diagnosis.

Eight women and 11 men (1.6% of our sample) had more than 100 visits. Among this group, the average number of visits was 164.1 (SD 77.0, range 101–415), whereas the group of patients with less than 100 visits had an average number of 17.9 visits (SD 17.1, range 0–92). A sensitivity analysis was performed where we modeled only patients that had fewer than 100 outpatient visits in FY 2003, as these patients appeared to have a significantly different pattern of use compared to the 19 veterans with 100 or more visits. When these 19 veterans were excluded from the analyses, the results did not vary significantly from the full sample. Female veterans again had a 27% higher rate of outpatient visits than male veterans (RR 1.27, 95% CI 1.15 to 1.40, $P < .001$).

DISCUSSION

A recent study of veterans that utilize VA services suggests that this population reports a significantly higher rate of health service utilization than the general U.S. population.²⁹ Therefore, it is important to understand factors that affect service use in the VA user population. In addition, previous research has suggested that among VA users, veterans with chronic pain are higher utilizers of outpatient services than those without chronic pain.² This study focused on gender differences in chronic pain, as well as outpatient use, among veterans.

Overall, female veterans with chronic pain had a 27% higher rate of outpatient visits in FY 2003 than male veterans. Women also had higher rates of visits to primary care, physical therapy, and other clinics, as well as visits to specifically address a pain condition. This higher use among women may be explained by gender differences in processing and coping with chronic pain or may be only related to differences that exist in utilization of outpatient resources in general.

Recent studies have suggested that men and women process pain differently. Several studies have shown that women have

lower pain thresholds and are less tolerant of noxious stimuli.^{30,31} Women have been shown to report greater levels of pain and distress than men with the same pathology or degree of tissue injury.^{30,32,33} Women are also more likely to develop chronic pain syndromes after an equivalent trauma.³⁰ In addition, women utilize more varied and effective coping mechanisms than men in dealing with pain.³⁰ It has been suggested that this may be the reason why women with pain visit health care facilities and social services more frequently.³⁴

We found that having a psychiatric diagnosis was a significant predictor of increased outpatient visits in veterans with chronic pain. Specifically, veterans with a concurrent diagnosis of depression had a higher rate of primary care, psychiatry, physical therapy, other clinic visits, visits to address pain, and total visits than those without depression. Similarly, veterans with PTSD also had a higher rate of primary care, psychiatry, other clinic visits, and total visits. Further research should be done to explore how psychiatric illness including PTSD may limit veterans' abilities to cope with chronic pain.

There are several limitations of this descriptive study. This study involved male and female veterans from one VA facility (Durham, NC). Therefore, results may not be generalizable to veterans that do not use the VA system or the general population. Although we identified men and women for the study population from the Durham VAMC and were able to obtain visit data in FY 2003 for all outpatient visits to VA clinics and hospitals, we did not include inpatient or emergency department visits, and we did not have access to information regarding visits to other community clinics, providers, or hospitals not affiliated with the VA health care system. Therefore, we may have underestimated overall health care use for this sample.

There are also limitations associated with the use of ICD-9 codes. It is possible that using ICD-9 codes to identify subjects with chronic pain resulted in a sample of patients with relatively high outpatient use because pain is more likely to have been coded if a veteran had made high numbers of outpatient visits for the condition. Although this should not alter the gender differences observed in this study, it may have implications for generalizability of the sample. In addition, poor coding at some encounters may have led to underestimation of the number of visits where pain was addressed. However, we also do not suspect that this would differ according to gender.

We acknowledge that there are multiple definitions of chronic pain. We defined chronic pain as having two outpatient visits for pain at least 6 weeks apart. Whereas some criteria use a longer timeframe to define chronic pain, we based our criterion on the VA classification of chronic pain, as well as other sources.^{18–20} Because we used outpatient visit data as our criterion for identification of subjects, we assumed that there may be some delay between onset of symptoms and visits to the outpatient clinics and that having two visits at least 6 weeks apart for a pain condition would satisfactorily identify chronic pain patients for this study.

The gap between identification by ICD-9 coding of a chronic pain condition in 2002 and 2003 visit data was variable for the sample. Because the number of primary care and referral visits would be most around the time patients were seen specifically for their pain condition, we might have underestimated outpatient visit utilization by examining the visit data for the following year. However, this limitation should not have affected determination of gender differences in outpatient utilization.

We found that female veterans with chronic pain had a higher rate of total outpatient visits, primary care visits, physical therapy visits, and visits to address pain than male veterans with chronic pain. Women veterans with chronic pain may need more resources to adequately manage chronic pain conditions, as well as associated psychiatric comorbidities. Providing these mental health resources in a systematic fashion may decrease total numbers of visits and visits to primary care clinics. Future studies should explore whether gender differences in outpatient visit use is related to patient satisfaction with pain management and narcotics use in this population.

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REFERENCES

1. Clark JD. Chronic pain prevalence and analgesic prescribing in a general medical population. *J Pain Symptom Manage.* 2002;23(2):131–7.
2. Kerns R, Otis J, Rosenburg R, Reid C. Veterans' reports of pain and associations with ratings of health, health-risk behaviors, affective distress, and use of the healthcare system. *J Rehabil Res Dev.* 2003;40(5):371–80.
3. Keogh E, Arendt-Nielsen L. Sex Differences in Pain. *Eur J Pain.* 2004;8:395–6.
4. Eriksen J, Sjogren P, Ekholm O, Rasmussen NK. Health care utilization among individuals reporting long-term pain: an epidemiological study based on Danish National Health Surveys. *Eur J Pain.* 2004;8:517–23.
5. Veterans Health Administration. VHA National Pain Management Strategy. Available at: http://www1.va.gov/pain_management/docs/VHAPainDirective_03.pdf and http://www1.va.gov/Pain_Management/page.cfm?pg=11. Accessed June 28, 2005.
6. Veterans Health Administration. Management of medically unexplained symptoms: Chronic Pain and Fatigue Working Group. VHA/DoD clinical practice guideline for the management of medically unexplained symptoms: chronic pain and fatigue. Washington (DC): Veterans Health Administration, Department of Defense. 2001 July.
7. Beckham JC, Crawford AL, Feldman ME, et al. Chronic posttraumatic stress disorder and chronic pain in Vietnam combat veterans. *J Psychosom Res.* 1997;43(4):379–89.
8. Otis JD, Keane TM, Kerns RD. An examination of the relationship between chronic pain and post-traumatic stress disorder. *J Rehabil Res Dev.* 2003;40(5):397–406.
9. Asmundson GJ, Wright KD, Stein MB. Pain and PTSD symptoms in female veterans. *Eur J Pain.* 2004;8(4):345–50.
10. Murdoch M, Polusny MA, Hodges J, O'Brien N. Prevalence of in-service and post-service sexual assault among combat and noncombat veterans applying for department of Veteran Affairs posttraumatic stress disorder disability benefits. *Mil Med.* 2004;169(5):392–5.
11. Bosworth HB, Butterfield MI, Stechuchak KM, Bastian LA. Self-rated health and health care service use among women veterans in a primary care clinic. *Womens Health Issues.* 2000;10(5):278–85.
12. Bosworth HB, Parsey KS, Butterfield MI, et al. Racial variation in wanting and obtaining mental health services among women veterans in a primary care clinic. *J Natl Med Assoc.* 2000;92(5):231–6.
13. Beneficiary Identification Records Locator System (BIRLS) Death SAS dataset. Maintained at Austin Automation Center. Updated August 2003. Available at: <http://www.virec.research.med.va.gov/References/VirecInsights/Insights-v01n5.pdf>. Accessed June 28, 2005.
14. Bland JM, Altman DG. Statistics notes: matching. *Br Med J.* 1994;309:1128.
15. Bergstralh E, Kosanke J. Gmatch program. SAS Macros 2003. Available at: <http://www.mayoresearch.mayo.edu/mayo/research/biostat/sasmacros.cfm>. Accessed November 11, 2004
16. Von Korff M, Wagner EH, Dworkin SF, Saunders KW. Chronic pain and use of ambulatory health care. *Psychosom Med.* 1991;53:61–79.
17. Blyth FM, March LM, Brnabic AJM, Cousins MJ. Chronic pain and frequent use of health care. *Pain* 2004;111:51–8.
18. Veterans Health Administration. Chronic pain primer. Available at: http://www1.va.gov/Pain_Management/page.cfm?pg=15. Reviewed May 2004; Accessed June 28, 2005.
19. Bajwa ZH, Shalmi CL, Warfield CA. Definition, pathogenesis, and evaluation of chronic pain. UpToDate version 12.3. http://www.patients.uptodate.com/topic.asp?file=genr_med/19495. Accessed February 7, 2005.
20. Bonica JJ. Definitions and taxonomy of pain. In: Bonica JJ, ed: *The Management of Pain*. 2nd edition, Philadelphia: Lea & Febiger, 1990, p19.
21. Tanaka P. ICD-9 CM easy coder 2004 edition. Montgomery: Unicor Medical, 2003.
22. Andersson HI, Ejlertsson I, Leden I, Schersten B. Impact of chronic pain on health care seeking, self care, and medication. Results from a population-based Swedish study. *J Epidemiol Community Health.* 1999;53:503–9.
23. Chrubasik S, Junck H, Zappe HA, Stutzke O. A survey on pain complaints and health care utilization in a German population sample. *Eur J Anaesthesiol.* 1998;15(4):397–408.
24. Haetzman M, Elliott AM, Smith BH, Hannaford P, Chambers WA. Chronic pain and the use of conventional and alternative therapy. *Fam Pract.* 2003;20(2):147–54.
25. Charlson ME, Pompei P, Ales KL, MacKenzie CR. A new method of classifying prognostic comorbidity in longitudinal studies: development and validation. *J Chronic Dis.* 1987;40:373–83.
26. Deyo RA, Cherkin DC, Ciol MA. Adapting a clinical comorbidity index for use with ICD-9-CM administrative databases. *J Clin Epidemiol.* 1992;45(6):613–9.
27. Dominick KL, Dudley TK, Coffman CJ, Bosworth HB. Comparison of three comorbidity measures for predicting health service use among patients with osteoarthritis. *Arthritis Rheum.* 2005;53(5):666–72.
28. McCullagh P, Nelder JA. Generalized linear models, 2nd edition. London: Chapman & Hall, 1989.
29. Singh JA, Borowsky SJ, Nugent S, et al. Health-related quality of life, functional impairment, and healthcare utilization by veterans' Quality of Life Study. *J Am Geriatr Soc.* 2005;53:108–13.
30. Miaskowski C. Women and pain. *Crit Care Nurs Clin North Am.* 1997;9(4):453–8.

31. **Riley JL, Robinson ME, Wise EA, Myers CD, Fillingim RB.** Sex differences in the perception of noxious stimuli: a meta-analysis. *Pain*. 1998;74:181-7.
32. **Moulin DE, Foley KM, Ebers GC.** Pain syndromes in multiple sclerosis. *Neurology*. 1988;38:1830.
33. **Puntillo K, Weiss SJ.** Pain: its mediators and associated morbidity in critically ill cardiovascular surgical patients. *Nurs Res*. 1994;43(1):31-6.
34. **Berkley KJ.** Sexual difference and pain: a constructive issue for the millennium. *Scientific Abstract NIH Gender and Pain Conference*. April 1998.