Effect of Health-Related Quality of Life on Women and Men's Veterans Affairs (VA) Health Care Utilization and Mortality

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INTRODUCTION: Although women will account for almost 11% of veterans by 2040, we know little about their health and functioning, particularly compared to men.

OBJECTIVE: To compare women and men veterans' health-related quality of life (HRQOL) and VA health care utilization and to see if previously described associations between HRQOL, subsequent VA health care utilization, and mortality in male veterans would generalize to women veterans.

METHODS: Prospective cohort study of all veterans who received medical care from an Upper Midwest Veterans Affairs facility between 10/1/96 and 3/31/98 and returned a mailed questionnaire.

RESULTS: Women's effective survey response rate was 52% ($n=1,500$); men's, 58% ($n=35,000$). In the following year, 9% of women and 12% of men had at least one hospitalization. One percent of women and 3% of men died in the post-survey year. After adjustment, women's HRQOL was higher than men's; for every 10-point decrement in overall physical or mental functioning, women and men had similarly increased risk/odds of subsequently dying, being hospitalized at a VA facility, or making a VA outpatient stop. Among younger women and women who received VA care outside of the Twin City metro area, poorer overall mental or physical health functioning was associated with fewer primary care stops; among their male counterparts, it was associated with more primary care stops.

CONCLUSION: Compared to men, women veterans receiving VA health care in the upper Midwest catchment area had better HRQOL and used fewer health services. Although VA health care utilization was similar across gender after adjusting for HRQOL, poorer mental or physical health was associated with fewer primary care stops for selected subgroups of women.

KEY WORDS: gender; quality of life; health care utilization; veterans.

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INTRODUCTION

With a medical care budget of \$25 billion in the fiscal year 2003, the Veterans Health Administration represents the largest integrated health care system in the United States, providing health care to approximately 4.9 million veterans.^{1,2} Veterans have poorer health, higher comorbidity, and lower health-related quality of life (HRQOL) than age-matched general U.S. and nonveteran populations,^{3,4} and they have fewer financial resources, such as supplemental health insurance.⁵ By providing high-quality care to these veterans, the Veterans Affairs (VA) health care system provides an important, effective safety net for the most vulnerable and socioeconomically disadvantaged veterans,^{2,6} while unburdening other systems that are ill-prepared to care for them.^{7–9}

Although most veterans are currently men, women represent the second fastest growing segment of U.S. veteran population following aging veterans, constituting approximately 6% of the total veteran population.¹⁰ However, their number is projected to exceed 11% by the year 2040.¹¹ Thus, with ever-increasing numbers of women veterans receiving VA health care, it has become increasingly important to understand women veterans' functional and health status and health care utilization patterns. This is particularly so because men and women veterans differ substantially in terms of the socio-demographic characteristics that influence health and health care utilization^{12,13} and because care models based solely on men translate poorly to women.¹⁴

Precisely how men and women veterans differ is unclear, however. Earlier data from a group of men and women veterans using services at the Boston VA Medical Center indicated that women veterans were younger, better educated, more likely to be working, and less likely to be married than male veterans.¹³ Physical and social functioning were similar across genders, but women reported poorer mental health and vitality and greater role limitation because of emotional problems in adjusted analyses.¹³ However, after adjustment for age and other covariates, they also reported better general health perception and better role functioning related to physical problems compared to men.¹³ In a more recent,

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nationally representative sample of men and women veterans using VA health services, Frayne and colleagues also showed comparable physical and mental health status between men and women once age, race/ethnicity, and education were controlled. However, in contrast to Skinner and colleagues' earlier findings, they found that among veterans aged 65 years or more, women had better mental health.

Although women are now routinely included in VA research, few studies report gender-stratified results, hence, potentially obscuring important gender differences. Thus, with the exception of the studies just described, we know little about the differences and similarities in men and women's HRQOL or how HRQOL might impact health care utilization or outcomes across gender. Recently, in efforts to enhance the VA's infrastructure for Women's Health Research and to better understand gender differences in health care needs and delivery, a VA national advisory group has called for routine publication of gender-specific data in all VA studies.¹⁵

We previously described associations between better HRQOL and lower subsequent VA hospitalizations, VA outpatient utilization, and 1-year mortality in a representative sample of men and women veterans using VA services in the Upper Midwest. However, these analyses combined results for men and women and did not test for unique gender effects. Here, we reanalyze these data, addressing these earlier deficiencies.

Based on the earlier studies, we hypothesized that in this sample, men's HRQOL would be lower than women's before adjustment for sociodemographic characteristics, but similar after adjustment. Because data on women veterans VA health care utilization relative to men's has also been conflicting,^{16,17} we do not make specific hypothesis regarding men and women's health care utilization,^{16,17} although a goal was to examine men and women's patterns relative to one another. Furthermore, we wanted to assess if our previously described associations between HRQOL and outcomes, such as VA health care utilization and mortality, held equally for women and men. We anticipated that they would.

METHODS

Subjects and Settings

As reported elsewhere, Veterans Health-related Quality of Life Study (Vet-QoL) was a cohort study designed to assess the health status and health care outcomes of all veterans with any VA in- or out-patient encounter within the Upper Midwest Veterans Integrated Service Network (former VISN 13) catchment area between 10/1/96 and 3/31/98.¹⁸ VISN 13 consisted of a regional network of 13 community-based outpatient clinics (CBOCs) and 5 VA medical centers that provided a continuum of primary to tertiary health care to veterans from all of Minnesota, North Dakota, and South Dakota and from selected counties in Iowa, Nebraska, Wisconsin, and Wyoming. VISN 13 is now part of the larger VISN 23. After excluding deceased veterans and those with invalid mailing addresses ($n=657$), we surveyed all 70,334 remaining veterans. Non-respondents were sent a second survey mailing 10 weeks later. A total of 40,508 returned completed surveys (58% effective response rate). Survey data were supplemented by administrative data.

Questionnaire

The questionnaire was mailed to subjects' homes and asked about sociodemographic characteristics (race/ethnicity, education level); smoking status; whether patients were told by their doctor that they had any of 6 medical diagnoses (arthritis, asthma/chronic obstructive pulmonary disease (COPD), depression, diabetes, hypertension, and heart disease); and HRQOL, as assessed by Short-Form 36 for veterans (SF-36V).^{4,19} The SF-36 is among the most commonly used self-administered questionnaires assessing individual's HRQOL²⁰⁻²² and measures physical functioning (PF), role limitations because of physical problems (RP), bodily pain (BP), general health (GH), energy/vitality (VT), social functioning (SF), role limitations because of emotional problems (RE), and mental health (MH). SF-36V differs from the original SF-36 only in that the RP and RE subscales were changed from a dichotomous to a 5-point scale to avoid floor and ceiling effects.^{4,19} Physical and mental component summary scores (PCS and MCS, respectively) were calculated from the eight subscale scores as recommended.²² PCS and MCS were norm-based and population-standardized with 0-100 scoring range, mean of 50, and standard deviation of 10. Higher scores on subscale and summary scales indicate better functioning in that domain.

Administrative Data

We obtained retrospective and prospective cohort data for the year before and the year after the survey using two VA administrative databases, the Patient Treatment File (PTF) and the Outpatient Clinic files (OPC). Using administrative data, the following outcomes were assessed for the year after survey:

- (1) *VA inpatient health care utilization in the year after survey*, examined as a dichotomous (any v. none) variable;
- (2) *VA outpatient health care utilization in the year after survey*. For outpatient care, we examined the total number of stops subjects made for any reason in the year after survey, and their total number of primary care, specialty medicine, and Surgery clinic stops. Mental health care stops in the year after survey were evaluated both continuously and as a dichotomous variable (any v. none).
- (3) *Mortality* was assessed using the VA's Beneficiaries Identification Record Locator System (BIRLS) death file, the PTF file, and Social Security Administration records.

We also used VA administrative data to extract other information that would likely influence study outcomes, such as *sociodemographic information* (e.g., marital and employment status) and veterans' *service connected rating*. Veterans' service connected rating is strongly predictive of health care access and VA health care utilization^{23,24} and reflects the level of disability they have incurred as a consequence of military service. Ratings range from 0% (no current disability) to 100% (total disability). Veterans with service connected ratings of 50% or more have higher priority for VA health care compared to veterans with lower ratings or no service connection rating and are exempt from VA pharmacy co-pays. Service connected ratings were trichotomized as follows: 1=none or 0%; 2=1-49%; or 3=50-100%.

Analyses

Study outcomes (dependent variables) were HRQOL, as reported in the mailed questionnaire; VA health care utilization in the year after survey, parameterized as described above; and mortality in the year after survey. The main independent variable of interest was gender. We compared men and women's unadjusted HRQOL, VA health care utilization, and sociodemographic characteristics using Chi-square tests with Yates' continuity correction or Student's *t* tests.

Gender Effects on HRQOL. Using multiple linear regression, we regressed each of the eight SF-36 subscale and the two component summary scores (PCS and MCS) on gender, the independent variable of interest, and the following covariates and confounders: (1) *demographic characteristics*: age, race (White or non-White), marital status, employment status, and education level; (2) *clinical measures*: current smoking status and the presence/absence of self-reported physician diagnoses of arthritis, chronic obstructive pulmonary disease (COPD)/asthma, diabetes, depression, hypertension, or heart disease; and (3) *health care utilization and access measures*: numbers of VA medical centers used (multiple site versus single site user), VA health care utilization in the year *before* survey, and service connected rating.

Gender Effects on VA Health Care Utilization in the Year After Survey. Using multiple logistic, Poisson, or linear regression as appropriate, we regressed veterans' VA outpatient and inpatient health care utilization in the year after survey on gender and the covariates and confounders described in the previous paragraph. In addition, these analyses controlled for subjects' PCS and MCS component summary scores. To see if gender moderated HRQOL's effects on health care utilization, we included interaction terms for gender-by-PCS summary score and gender-by-MCS summary score in each of these models.

Gender Effects on Mortality in the Year After Survey. Using multivariable logistic regression, we regressed veterans' vital status (deceased versus not) 1 year from the time of survey on gender and all the covariates and confounders described previously, including, veterans' PCS and MCS summary scores. To see if gender moderated HRQOL's effects on mortality, we again included interaction terms for gender-by-PCS summary score and gender-by-MCS summary score.

Reporting Results. Gender-specific, adjusted probabilities of being hospitalized in the year after survey, of dying in the year after survey, or of having one or more mental health clinic stops in the year after survey were computed as the least squares means produced by the SAS system's GENMOD procedure and transformed back to the probability scale. Gender-specific estimates of mean number of primary care visits, Surgery, specialty medicine, and mental health stops were computed as the least square means using SAS system's PROC MIXED procedure. Risk and odds ratios are reported per each 10-point decrement in PCS or MCS summary scores. All analyses were done using SPSS, version 11.5 (Chicago, IL) or

SAS version 9.1 (Cary, NC). A *P* value <.05 was considered significant.

RESULTS

Demographic and Clinical Characteristics

Table 1 summarizes women's and men's and sociodemographic and clinical characteristics. As can be seen, compared to men, women veterans were significantly younger, less likely to be married, and reported more education. Women reported fewer medical conditions (mean of 1.7 versus 1.9, respectively) compared to men.

HRQOL

Compared to men, women tended to report better physical functioning, bodily pain, role physical, general health, and role emotional subscale scores and better physical component summary (PCS) scores, but similar mental component summary (MCS) scores, before adjustment. Table 2 shows the raw number and percentage of women and men scoring within

Table 1. Respondent Characteristics by Gender

Characteristics	Women veterans	Men veterans	<i>P</i> value
Age (mean ± SD) ^a	49.8 ± 18.2	61.5 ± 15.1	<.001
Race (% White) ^{b,c}	89%	90%	.5
% Married ^{a,c}	36%	54%	<.001
Education level (%) ^b			<.001
Less than 8th grade	51%	54%	
9–12th grade	1%	7%	
Graduated high school	14%	20%	
College and beyond	34%	19%	
Employment status (%) ^a			<.001
Employed	40%	33%	
Unemployed	31%	22%	
Retired	19%	37%	
Unknown	11%	7%	
Number of comorbidities reported (of 6 possible) ^b			<.001
None	23%	17%	
One	30%	28%	
Two	25%	26%	
Three or more	22%	30%	
Service connected rating ^a			<.001
None or 0%	55%	61%	
>0–49%	28%	25%	
50–100%	16%	14%	
Percentage with ≥1 clinic stops in the year after survey ^a			
Primary care Clinic	65%	61%	<.001
Mental Health Clinic	21%	15%	<.001
Specialty Medicine Clinic	29%	34%	<.001
Surgery Clinic	38%	41%	.002
Percentage deceased 1 year after survey ^a			

SD Standard deviation, COPD chronic obstructive pulmonary disease

^aAdministrative database derived variables: women (*n*=3,028), men (*n*=67,029–67,514)

^bSurvey derived variables: women (*n*=1,254–1,535), men (*n*=27,895–38,792);

^cReference category for race was "Non-white", and for marital status, it was "Not married or unknown".

Table 2. Raw Number (N) and Percentage (%) of Male and Female Veterans in Each PCS and MCS Score Category

Characteristics	Score category (in increments of 10)								Total
	0-10	>10-20	>20-30	>30-40	>40-50	>50-60	>60-70	>70	
Female PCS N (%)	1 (0.1)	92 (6.6)	277 (19.9)	397 (28.6)	328 (23.6)	273 (19.6)	22 (1.6)	0 (0)	1,390 (100)
Male PCS N (%)	79 (0.2)	2,615 (8.1)	9,125 (28.4)	9,122 (28.4)	6,705 (20.9)	4,234 (13.2)	231 (0.7)	3 (0)	32,114 (100)
Female MCS N (%)	5 (0.4)	47 (3.4)	149 (10.7)	237 (17.1)	303 (21.8)	435 (31.3)	209 (15.0)	4 (0.3)	1,390 (100)
Male MCS N (%)	33 (0.1)	773 (2.4)	2,971 (9.2)	6,466 (20.1)	7,757 (24.1)	9,295 (28.9)	4,694 (14.6)	144 (0.4)	32,133 (100)

each 10-point increment of PCS and MCS scores. After adjustment, as Figure 1 shows, most unadjusted HRQOL differences by gender persisted, although the difference in physical functioning (PF) scores attenuated. With adjustment, women's mean MCS score was also significantly better than men's, although of marginal clinical importance.

VA Health Care Utilization and Mortality in the Year After Survey

Before adjustment, Table 1 shows that compared to men respondents, a higher proportion of women respondents made one or more VA primary care or mental health stops in the year after survey, whereas the men were slightly more likely to make a specialty care or Surgery stop in the year after survey. Figure 2 shows the gender-specific, mean adjusted number of VA clinic stops made in the year after survey and the mean adjusted odds of being hospitalized or of dying in the year after survey. Whereas unadjusted results had suggested that women were more likely than men to make at least one VA mental health stop in the year after survey, the adjusted findings showed that the mean number of mental health stops women

made in the year after survey was dramatically lower than men's mean. Figure 2 also shows that even with adjustment, women's mortality was lower than men's.

Gender-Specific Impact of HRQOL on VA Health Care Utilization and on Mortality in the Year After the Survey

Table 3 shows the within-gender association between each 10-point decrement in PCS or MCS score and subsequent VA health care utilization or risk of dying, after adjustment for other covariates and confounders. Tests for differences in this association across the two genders are also shown. In the year after survey, women and men who had reported lower PCS scores experienced higher adjusted odds of being hospitalized or dying compared to women and men who had reported higher PCS scores. The magnitude of these effects was similar across gender.

On average, lower PCS and MCS scores also influenced men's VA outpatient health care utilization in the direction expected: namely, those with lower scores made more primary care stops and had higher adjusted odds of making at least one mental health care stop in the year after survey than those

Figure 1. Multivariable-adjusted least squares means values ($\pm$ SE) for each SF-36V subscale and summary scale score for survey-respondent women and men veterans. Multivariable model adjusted for the following covariates: age, race, marital status, education, employment status, multisite use, smoking status, percent service connection; presence of arthritis, asthma/chronic obstructive pulmonary disease, depression, diabetes, hypertension or heart disease. PCS physical component summary, MCS mental component summary, CI confidence interval, PF physical functioning, RP role physical, BP bodily pain, VT vitality, SF social functioning, RE role emotional, MH mental health.

Figure 2. Multivariable-adjusted rates of 1-year health care utilization and mortality in women and men veterans. Multivariable model adjusted for the following covariates: age, race, marital status, education, employment status, multisite use, smoking status, percent service connection; presence of arthritis, asthma/chronic obstructive pulmonary disease, depression, diabetes, hypertension or heart disease, respective prior utilization, and physical and mental component summary scores of the SF-36V (PCS and MCS). P values represent the comparison between women's and men's adjusted scores for each outcome, respectively.

Table 3. Adjusted Association Between SF36-V Component Scores (PCS, MCS) (As Reported at Time of Survey) and VA Health Care Utilization and Mortality in the Year After Survey

Outcome	Adjusted risk ratio or odds ratio per 10 point PCS decrement (95% CI)		Adjusted risk ratio or odds ratio per 10 point MCS decrement (95% CI)	
	Women	Men	Women	Men
Health care utilization				
Number of primary care stops	0.95 (0.92, 0.98)	1.10 (1.09, 1.11)*	0.93 (0.91, 0.96)	1.02 (1.00, 1.03)*
≥1 Mental health stop	1.26 (1.08, 1.46)	1.02 (0.97, 1.07) [‡]	1.42 (1.24, 1.63)	1.38 (1.32, 1.44) ns
Number of specialty medicine stops	1.20 (1.14, 1.26)	1.20 (1.19, 1.21) ns	1.06 (1.01, 1.10)	1.10 (1.08, 1.11) ns
Number of Surgical Stops	1.15 (1.10, 1.20)	1.15 (1.14, 1.17) ns	1.01 (0.97, 1.04)	1.00 (0.99, 1.01) ns
≥1 Hospitalization	1.46 (1.22, 1.75)	1.38 (1.33, 1.45) ns	1.18 (1.02, 1.37)	1.08 (1.04, 1.13) ns
Death	2.25 (1.27, 4.02)	1.80 (1.64, 1.97) ns	1.22 (0.79, 1.89)	1.39 (1.29, 1.49) ns

ns Not significant ($P \geq .05$)

Tests for differences in effect across gender * $P \leq .0001$; [‡] $P \leq .001$; [§] $P \leq .01$

with higher scores. Lower PCS and MCS scores were also, as expected, associated with women having higher adjusted odds of making at least 1 mental health care stop in the year after survey. However, in contrast to our expectations and opposite to what we found in men, lower PCS and MCS scores were associated with women making *fewer* primary care visits in the year after survey.

Post Hoc Exploratory Analyses

To better understand why women's crude rate of primary care stops was higher than men's given the adjusted findings, we compared women's and men's crude numbers of primary care stops in each decile of PCS and MCS score. We found that women with PCS scores of ≥ 52.4 or MCS scores of ≥ 61.7 (i.e., in the highest decile of PCS and MCS scores, respectively) made more primary care stops in the year after survey than other men and all other women. Put in another way, these women's overall higher use of primary care accounted for the crude difference in women and men's mean number of primary care stops.

To address gender differences in age, we stratified subjects according to whether they were under the age of 50 years at the time of survey or 50 years or older. Within each stratum, we then compared women's and men's mean adjusted number of primary care stops and their adjusted odds of making at least 1 mental health care stop in the year after survey. Main findings persisted in the younger age group, but attenuated and became insignificant in the older age group. We also compared women's and men's mean adjusted number of primary care stops and adjusted odds of making at least 1 mental health care stop in the year after survey among those who received care at the VA sites within the Twin Cities' metro area and among those who received care at all other VISN-13 sites. All findings remained the same for those who did not receive care outside the Twin Cities Metro area. Among those who received care within the Twin Cities Metro area, however, most gender differences attenuated and became insignificant.

DISCUSSION

Consistent with earlier data, women veterans who used Upper Midwest VA medical facilities were younger, better educated, more frequently employed, and less often married than men

who used these facilities. Even adjusting for these differences, women appeared healthier and reported better health-related quality of life. Thus, in contrast to women in the United States, Canadian, and British general populations,^{22,25,26} the women veterans in our study had slightly but significantly better scores on most SF36V subscales and on the MCS scale compared to the men, even after adjustment for other socio-demographic, clinical, and health care utilization differences. Several of these differences, such as role limitations because of physical problems (RP) and general health perceptions (GH), crossed the accepted threshold for clinical meaningfulness,²⁷ while others approached the threshold (e.g., role limitations because of emotional problems, social functioning).

That women veterans might have better HRQOL than men should not be surprising. Most women veterans report good to excellent health, even as they age,²⁸ and their all-cause mortality is lower than age-matched women civilians.^{29–31} Furthermore, the health professional background of many women veterans could result in their adopting healthier lifestyles than men, resulting in better HRQOL. While our findings contrast somewhat to Skinner et al.'s,¹³ in that our female subjects reported better mental health and fewer emotion-related role limitations than the men, they are consistent with Frayne and colleagues' results among veterans aged 65 years and older.¹²

In our sample, men and women veterans had similar VA inpatient and total outpatient health care utilization after adjustment for HRQOL and other covariates and confounders. The directional effects of poorer mental and physical functioning on women's subsequent health care utilization and mortality were also generally similar to that seen for men: poorer mental and physical functioning predicted more utilization and greater mortality. This pattern did not hold true, however, for the number of primary care stops men and women made in the year after survey.

Among younger women veterans receiving VA care outside the Twin Cities' metro area, poorer mental or physical functioning was associated with fewer primary care stops in the subsequent year compared to their female counterparts who reported better functioning. Among men, regardless of age or where care was received, the opposite was true: those with poorer mental or physical functioning made more primary care stops than did men with better functioning. Across the former VISN 13 catchment area, this difference in utilization translates into 15,608 and 9,364 fewer VA primary care stops for

women compared to men per year, for each 10-point PCS or 10-point MCS change, respectively. Whether this reflects a consumer surplus for men, a welfare loss for women, or an appropriate gender difference based on different health care needs is unclear.

An appropriate gender difference might occur, for example, if younger, poorer functioning women veterans had fewer medical illnesses than their male counterparts, and hence, required less primary care. Women have higher prevalence of depression compared to men, but lower prevalence of other chronic diseases (e.g., COPD, diabetes, hypertension, and heart disease), supports this notion. The apparent gender difference might also be explained if younger, poorer functioning women veterans who received care outside the Twin Cities supplemented or substituted non-VA primary care for VA primary care more than their male counterparts did. For example, as hospital-based VA clinics (as would be found at the Twin Cities' Minneapolis VA Medical Center) tend to offer a higher range of gynecological and contraceptive services than clinic-based VA sites,³² younger women receiving care outside the Twin Cities may have elected to obtain primary and gynecological care from a single, non-VA source to avoid fragmented care. Our data would not have captured this phenomenon.

These women may also have had problems accessing VA primary care. Such concerns have been previously raised for mentally ill women veterans.^{16,28} As inverse associations between PCS and MCS scores and number of primary care stops made were found only for women receiving care outside the Twin Cities, it may also be that this group faced unique access barriers. Transportation problems and distance lived from a VA medical facility robustly predict reduced use of VA health care services^{23,33-37} and are more problematic for rural-dwelling veterans than for urban-dwelling veterans. Based on the 2000 census, we estimate that approximately 43% of women and 47% of men veterans in VISN-13 lived in rural counties.

Problems arranging child care while attending medical appointments might also have differentially affected younger women veterans. In general, persons with lower functioning have greater social isolation, smaller social networks, and less instrumental support than persons with better functioning.³⁸ These relative lacks, which might lead to a few options for short-term child care, are likely compounded by living in a rural area. Unfortunately, we did not ask subjects if they had small children at home-in retrospect, an important limitation that we hope future researchers will redress.

Most of the expected growth in women veterans' numbers is expected to come from women of child-bearing age.^{12,39,40} Yet in a sample of New England VA health care providers, only a minority believed it important that VA medical facilities accommodate women veterans' child care responsibilities.⁴¹ In a literature review examining predictors of VA health care utilization in women, we found only two (arising from a single study) that examined the impacts of having dependent children,^{41,42} even though child care problems are a well described barrier for nonveteran women's access of health services.⁴³ If rural women face disproportionate barriers to care access because of child care needs, the VA may want to be more proactive in redressing this, perhaps by offering drop-in babysitting services. The VA "van system," an informal network of drivers who bring rural veterans into city centers for VA

appointments, may also need to adapt to accommodate women veterans and veterans with children.

Integrated care delivery models, where mental health and primary care are delivered in the same space and often concurrently, might also benefit poorer functioning, younger women with transportation, or child care difficulties by reducing the number of times they have to travel to VA medical facilities. The Minneapolis VA Medical Center, for example, houses one of the oldest VA comprehensive women's health care centers in the nation and was a pioneer in providing this kind of care to women veterans. Among women and men receiving VA medical care in the Twin Cities metro area, lower PCS and MCS scores had similar impacts on the number of primary care stops they made in the year after survey, suggesting that this integrated care model (which is not currently offered to the men) successfully reduced the gender difference we saw among veterans who received care at other VA facilities. While such integrated care models would likely also benefit men, our data suggest that younger, poorer functioning women might especially benefit.

In 1995, the VA began establishing satellite primary care clinics, known as Community Based Outpatient Clinics (CBOCs), in rural underserved areas to reduce veterans' travel barriers to receiving VA health care.⁴⁴ In a small sample of rural Minnesota veterans, Borowsky and colleagues showed that veterans who perceived greater problems accessing care at the VA tertiary treatment centers, women veterans, and veterans with poorer mental health tended to prefer CBOC care to tertiary VA center care.⁴⁵ Thus, establishing more CBOCs might also improve these women's access to primary care. At the time of data collection, there were 19 CBOCs in the VISN 13 catchment area; in 2006, this increased to 26 CBOCs.

While the finding of fewer primary care stops among women with poorer HRQOL was concerning and could indicate problems with access to VA services, the inverse association between poorer mental or physical functioning and greater primary care stops among the men was, conversely, largely reassuring. Previous studies have associated mental illness with receiving fewer preventive services⁴⁶⁻⁴⁸ and making fewer medical visits/stops.^{46,48,49} Thus, at least for men with poorer mental functioning, it appears that VISN 13/23 successfully reduced some barriers to receiving primary care.

Our response rate, although lower than ideal, was comparable to that of several other large veteran surveys.^{4,12,13,50} However, nonresponse and sample coverage bias could affect study conclusions, especially as women veterans were slightly less likely than men to return study questionnaires. Because the sample was limited to veterans using VA services in the Upper Midwest, findings may not generalize to veterans who do not use VA services or to veterans in other parts of the country. Likewise, the small proportion of minority veterans in the Upper Midwest limits generalizability to these groups. Conversely, our overall inpatient and outpatient utilization results are similar to those reported for nationally representative groups of veterans in the 1978 Health Interview Survey¹⁷ and 1992 National VA survey.¹⁶ This consistency across time periods and samples is reassuring. Other strengths include the study's large sample size, its prospective assessment of health care utilization and mortality, and the ability to adjust for subjects' sociodemographic characteristics and for some parameters of medical comorbidity, health care access, and prior health care utilization.

Overall, women veterans in the Upper Midwest who used VA services had better HRQOL than men, even after adjusting for their differences in age, education, marital status, and some underlying self-reported comorbid conditions. For the most part, poorer HRQOL predicted greater health care utilization and greater mortality for both men and women. Reasons for the apparently paradoxical association between poorer mental health and less primary health care utilization among younger women and women receiving care outside the Twin Cities' metro area are unclear, but could include less need for primary care services among these women, greater reliance on non-VA primary care, access difficulties, or bias related to non-response/inadequate sample coverage. Because women, and particularly, women of child-bearing age, represent an increasingly important component of the VA's demographic, research to distinguish between these possibilities is needed.

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