

Received: 2013.02.26
Accepted: 2013.04.05
Published: 2013.05.22

Health status profile and health-related quality of life of veterans attending an out-patient clinic

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Data Interpretation D
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Source of support: None

Background: There is paucity of data concerning the self-perceptions of health status and health-related quality of life (HRQoL) of veterans with multiple chronic medical conditions.





Material/Methods: Veterans who attended an out-patient power wheelchair clinic at a tertiary VA Medical Center were assessed. Health status and HRQoL were measured by using the EuroQol (EQ-5D) questionnaire. The EuroQol (EQ-5D) visual analogue scale (EQ-5D_{VAS}) measured their health state, and average values of the (EQ-5D) questionnaire for mobility, self-care, usual activities, pain or discomfort, and anxiety or depression (EQ-5D_{profile}), and the EQ-5D_{utility} measured their HRQoL.

Results: Of the 170 veterans who attended the out-patient clinic, the mean (\pm SD) age was 69.6 \pm 10.7 years, male/female ratio was 163/7, and 88% were non-Hispanic whites. Fifty-four percent were retired, 39% had a registered disabled, and only 3% were employed. Thirty-three percent were current smokers. More than 64% of the veterans had 4 or more co-morbid conditions for which they were receiving treatment. The mean (\pm SD) initial EQ-5D_{profile}, EQ-5D_{utility}, and EQ-5D_{VAS} scores were 10.3 \pm 1.5, 0.75 \pm 0.05 and 45.3 \pm 18.9, respectively. The social-demographic variables studied (age, gender, education, marital status, employment, co-morbid conditions, and current smoking history) were only able to predict the mobility and anxiety/depression domains of the EQ-5D.

Conclusions: Veterans who considered themselves disabled had multiple chronic medical conditions. Age, employment state, and number of chronic medical conditions were associated with poor health state and HRQoL. No relationship was found between health state and HRQoL in this sample of veterans.

Key words: **veterans • health state • quality of life • health care • health care initiatives • out-patient clinic • EuroQol questionnaire • co-morbidities • observation**

Full-text PDF: <http://www.medscimonit.com/download/index/idArt/889097>

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Background

Multiple chronic medical conditions are increasingly being recognized as a cause of substantial morbidity (disability) and mortality [1–3] and have been associated with decreased sense of wellbeing and health-related quality of life (HRQoL) [4]. Yu et al showed that 72% of VA patients have at least 1 chronic medical condition and 33% have 3 or more, compared to the approximately 60% of Medicare enrollees with chronic medical conditions. Thus, veterans have a high prevalence of chronic health-related conditions. Veterans were also found to be older than the general population [1]. Given this information, we wanted to know how veterans perceived their health state and HRQoL.

The measurement of health state is central to the evaluation of health care. By observing the patient's health state, the benefits and limitations of the health care provision for individual and groups of patients can be assessed. Periodic reassessment of an individual's perception of health state provides important information on the extent of any changes in the health state of a population occurring when specific health-care initiatives are instituted. It also informs health care providers when health resources need to be allocated to help improve the provision of health care. According to Ware and Sherbourne, there is "an increasing consensus towards the centrality of the patient's point of view in monitoring medical care outcomes" [5].

There are several standardized health-related quality of life (HRQoL) measures designed for use in clinical practice and research, health policy evaluations, and general population surveys. They include the Short Form Health Survey with 36 questions (SF-36), its shorter version SF-12, the Quality of Well-Being Scale (QWB), the Nottingham Health Profile (NHP), the Sickness Impact Scale (SIP), and the EuroQoL (EQ-5D) questionnaire with established reliability and validity [6–22]. We decided to measure our veterans' health state and HQoL with the EuroQoL (EQ-5D) questionnaire due to its ease of self-administration in an out-patient setting. It was hypothesized that poor health state and poor HRQoL would be reported by veterans with increasing age and increasing number of co-morbidities.

Material and Methods

Participants and procedure

Participants in this study were obtained via retrospective chart review of all veterans who underwent clinical evaluation at our out-patient powered wheelchair clinic over a 12-month period (1/1/2009 to 12/31/2009) at the Oklahoma City Veterans Affairs Medical Center. There were no inclusion or exclusion criteria. Patients attending the powered wheelchair clinic receive

a detailed clinical evaluation including: a) veterans self-completing the EuroQoL (EQ-5D) questionnaire; b) documentation of the main medical reason for their limited ability to ambulate, as well as all other chronic medical conditions for which they were receiving ongoing treatment and follow-up with their primary care physician; c) current smoking state, and d) physical examination of their: i) cognitive state by Mini-Mental State Examination (MMSE), ii) vision by visual acuity and visual field testing, iii) motor strength testing using the Medical Research Council grade, and iv) gait testing by 2-minute timed walk test. Additionally, a caregiver's report was obtained as to why the veteran needed a powered wheelchair for their household or community ambulation. The patient-provided list of chronic medical conditions was cross-checked for accuracy with the patient's problem and medication list in the computerized patient record system. One of the authors (MHR) had a face-to-face encounter with all the participants who completed the EQ-5D list to confirm patient understanding of their question responses and to improve the accuracy and validity of their responses.

Data collected included age, gender, ethnicity, marital and employment status, level of education, smoking habit and other chronic medical conditions that are routinely collected as a part of their evaluation in the out-patient clinic. Local Institutional Review Board (IRB) and the local Veterans Affairs Research and Development Committee approval were obtained for the study.

Measures

The EuroQoL (EQ-5D) questionnaire [19] was chosen to evaluate health state and HRQoL. This standardized non-disease-specific questionnaire was completed by the veterans as a part of their initial in-clinic evaluation for a powered wheelchair.

Three scores are commonly derived from the EQ-5D questionnaire: 1) EQ-5D_{profile}, 2) EQ-5D_{utility}, and 3) EQ-5D_{VAS}, each with its own scoring system. The EQ-5D_{profile} score is a descriptive system that measures patient health state in 5 domains: mobility, self-care, usual activities, pain/discomfort, and anxiety/depression. Each domain is rated for the degree of severity of perceived problems: no health problems (Level 1), moderate health problems (Level 2), and extreme health problems (Level 3). A total of 243 (3⁵) health states can be theoretically described by the EQ-5D_{profile} score. The EQ-5D_{profile} score is an unweighted index of HRQoL, but the EQ-5D_{utility} score is a weighted index of HRQoL ranging from 0 (dead) to 1 (healthy). The EQ-5D_{VAS} score is a quantitative measure of patient self-evaluation of global health state. The score is derived from their responses to a visual analogue scale, with marked endpoints of 0=worst imaginable health state and 100=best imaginable health state. The duration of each health state is supposed to be 1 year [18].

Table 1. Baseline characteristics of the Study Sample [Mean \pm SD; n (%)].

N=170	
Patient characteristics	
Age (years)	69.4 \pm 10.7
Gender M: F	163: 7 (96: 4)
Ethnicity	
White	149 (88%)
Black	16 (9%)
Hispanic	0
Native American	4 (2%)
Asian	1 (1%)
Education	
Less than high school	34 (21)
High school	62 (39)
College	47 (30)
Graduate school	15 (9)
No degree	2 (1)
Marital status	
Married	98 (58)
Divorced	36 (21)
Single	7 (4)
Widow	29 (17)
Employment	
Employed	3 (2)
Unemployed	9 (5)
Disabled	67 (39)
Retired	91 (54)
Smoker (%)	56 (33)
MMSE	25.5 \pm 4.1
Mean initial QoL Measure score	2.4 \pm 1.2
Mean initial EQ-5D_{utility} score	0.75 \pm 0.05
Mean initial EQ-5D_{profile} score	10.3 \pm 1.5
Mean initial EQ-5D_{VAS} score (n=155)	45.3 \pm 18.9

MMSE – Mini-Mental State Examination; QoL – Quality of Life; EQ-5D – European Quality of Life-5 Dimensions.

The EQ-5D scale covers different levels of impact of disease on the individual: impairment, disability, and handicap (see Appendix). The scale has demonstrated good test-retest reliability and validity [20–22]. However, it suffers from a ceiling effect because it is less responsive in registering a change in health when the score is high [20]; thus, there must be a dramatic change in health state for it to register. The advantage of this self-administered questionnaire is that it is short and easy to complete, thereby facilitating its completion and return. The EQ-5D provides the capacity to measure HRQoL in a quantifiable and simple standardized manner. The information

captured by the self-reported problems on the EQ-5D questionnaire produces a unique health status measurement for which there is a corresponding index value based on the standardized scores of the general population [23]. It can also be used as an outcome measure to detect change in an individual's HRQoL and its economic evaluation [24].

Statistical analysis

Data were analyzed using SAS (SAS System for Windows, ver. 9.2, SAS Institute Inc., Cary, NC). Statistical significance was set at $p < \leq 0.05$ for all analyses. Descriptive statistics for the entire study population were calculated (mean and standard deviation [SD] for continuous variables and proportions for categorical variables; Table 1). Participant categorization based on their responses to the EQ-5D questionnaire was by percentage (Table 2). The Spearman correlation was computed to assess the relationship between EQ-5D_{utility} and EQ_{VAS} scores. Group differences in EQ-5D scores according to the socio-demographic variables for the continuous variables were evaluated by using the nonparametric Kruskal-Wallis rank test due to abnormal distributions and sample size differences. Post hoc tests were conducted for significant effects using the method described by Gibbons [25] with a Bonferroni correction. The ordinal multiple logistic regression model (proportional odds model) was used to test the research hypotheses regarding the relationship between the likelihood of the severity rating in each of the EQ-5D dimensions and socio-demographic variables. The 7 socio-demographic variables examined and categorized were (with the underlined group serving as the reference group): 1) age (48–59, 60–69, 70–79, and 80–91), 2) gender (male and female), 3) educational attainment (less than high school, high school, and college or more), 4) marital status (married, divorced, single, and widow), 5) employment status (employed, unemployed, disabled, and retired), 6) chronic medical conditions (3 or fewer, 4 to 6, 7 or more), and 7) smoking status (smoker and non-smoker).

Results

Available demographic information (Table 1) indicated that the majority of the participants were males (96%) with a mean age of 69.4 (10.7 SD). The mean initial EQ-5D_{profile}, EQ-5D_{utility}, and EQ-5D_{VAS} scores were 10.3 \pm 1.5, 0.75 \pm 0.05 and 45.3 \pm 18.9, respectively. On initial evaluation, the majority of veteran responses to the 5 dimensions of the EQ-5D questionnaire were indicative of “some problems”. Mobility had the highest endorsement (85%), followed by self-care and usual activities such as work, family, housework, and leisure activities limitation (62% each) (Table 2).

Differences in EQ-5D_{utility} and EQ-5D_{VAS} scores were independently examined for each of the socio-demographic variables.

Table 2. Frequency of responses to each of the EQ-5D dimension (n [%]).

EQ-5D dimensions	No problems	Some problems/moderate	Unable/extreme
Mobility	2 (1)	144 (85)	24 (14)
Self-care	44 (26)	106 (62)	20 (12)
Usual activities (e.g. work, study, housework, family or leisure activities)	7 (4)	103 (61)	60 (35)
Pain/discomfort	21 (12)	97 (57)	52 (31)
Anxiety/depression	59 (35)	80 (47)	31 (18)

Table 3. Median (Interquartile range) EQ-5D_{Index} and EQ-5D_{VAS} scores by socio-demographic groups.

Variables	n	EQ-5D _{Index}	p	EQ-5D _{VAS}	p
Age group (years)			.10		.02
48–59	30	.76 (.06)		40 (30)	
60–69	63	.74 (.06)		40 (20)	
70–79	38	.74 (.05)		50 (30)	
80–91	39	.76 (.06)		50 (25)	
Gender			.30		.37
Male	163	.75 (.05)		41 (24)	
Female	7	.79 (.13)		35 (20)	
Education			.51		.55
Less than high school	36	.74 (.06)		50 (20)	
High school	62	.75 (.05)		40 (15)	
College or more	62	.75 (.08)		42.5 (30)	
Marital status			.25		.99
Married	98	.74 (.05)		45 (20)	
Divorced	36	.73 (.06)		41 (30)	
Single	7	.77 (.05)		40 (30)	
Widow	29	.75 (.07)		40 (24)	
Employment			.82		.02
Employed	3	.76 (.04)		41 (53)	
Unemployed	9	.75 (.03)		45 (20)	
Disabled	67	.74 (.07)		40 (20)	
Retired	91	.75 (.05)		50 (20)	
Chronic medical conditions			<.0001		.84
1–3	40	.79 (.06)		42.5 (30)	
4–6	108	.74 (.05)		40.5 (30)	
7–11	22	.70 (.03)		41 (15)	
Smoking status			.72		.32
Smoker	56	.75 (.06)		40 (20)	
Non-smoker	114	.75 (.06)		45 (29)	

The EQ-5D_{utility} scores differed only by the number of chronic medical conditions (Table 3). Post hoc tests showed that EQ-5D_{utility} scores differed significantly across the 3 chronic condition groups, with higher scores observed for subjects with 3 or fewer chronic conditions. The EQ-5D_{VAS} scores differed between age groups and according to employment status (Table 3). Post hoc tests revealed higher EQ-5D_{VAS} scores for subjects aged 70 years and above in comparison to those

younger than 70 and for retired participants in comparison to disabled participants. No differences were noted for other socio-demographic variables.

The Spearman correlation showed no relationship between EQ-5D_{utility} and EQ_{VAS} scores ($r_s=0.02$, $p=0.79$). Higher EQ-5D_{utility} Index and EQ_{VAS} scores did not translate in being community ambulators or being employed. The ordinal logistic

Table 4. Results of the proportional odds model using EQ-5D severity rating as response with three ordered categories.

Variable	Logistic coefficient	Standard error	p	Odds ratio	95% CI
Mobility			0.04		
Age			0.23		
Gender			0.37		
Education			0.75		
Marital status			0.30		
<i>Employment</i>			0.04		
Employed (ref = Retired)	-0.44	3.31	0.89	0.64	<.001-420.5
Unemployed	-3.50	1.32	0.008	0.03	0.0-0.40
Disabled	-2.05	0.83	0.01	0.13	0.03-0.66
<i>Chronic medical conditions</i>			0.02		
4-6 (ref = 1 to 3)	0.22	0.64	0.73	1.24	0.35-4.38
7-11	-1.61	0.79	0.04	0.20	0.04-0.94
Smoking Status			.51		
Anxiety/depression			0.02		
Age			0.21		
Gender			0.20		
<i>Education</i>			0.003		
Less than HS (ref = High school)	-0.42	0.42	0.32	0.66	0.29-1.51
College or more	1.00	0.37	0.006	2.73	1.33-5.58
Marital status			0.23		
Employment			0.64		
Chronic Medical Conditions			0.31		
Smoking Status			0.99		

Results presented only for those EQ-5D dimensions with significant findings. Further, logistic coefficients are presented only for the significant predictors of each dimension severity rating.

Table 5. EQ-5D_{Index} and EQ-5D_{VAS} scores according to employment status and chronic medical conditions.

Employment Status	EQ-5D _{Index}			EQ-5D _{VAS}		
	Chronic medical conditions			Chronic medical conditions		
	0-3	4-6	7+	0-3	4-6	7+
Disabled	.79 (.05)	.73 (.04)	.70 (.02)	45.2 (20.3)	38.3 (17.4)	39.7 (17.0)
Retired	.80 (.08)	.75 (.03)	.69 (.05)	47.9 (19.9)	50.4 (19.5)	43.3 (13.5)
Unemployed	.76 (.11)	.74 (.02)	-	30.0 (0)	47.5 (2.9)	-
Employed	-	.76 (.02)	-	-	58.0 (30.3)	-

regression for the proportional odds model showed that socio-demographic variables contributed significant predictive ability to the mobility (p=.038) and anxiety/depression (p=.015) dimensions, but did not increase the predictive ability of the other EQ-5D dimensions such as Self-care, Usual Activities, and Pain/Discomfort (Table 4). Individual regression coefficients using the Wald chi-square statistic for the Mobility and Anxiety/Depression dimensions showed employment status and number of chronic medical conditions were significant predictors of EQ-5D mobility domains severity ratings (p<.05). The cumulative probability of increased mobility impairments was significantly lower for the disabled (OR=.13) and unemployed

(OR=.03) compared to the retired, and did not differ for the employed compared to the retired. Similarly, the cumulative probability of increased mobility impairments was significantly lower for the group with 7 or more chronic medical conditions (OR=0.199) compared to those with 3 or fewer chronic medical conditions, and did not differ for those with 4 to 6 chronic medical conditions. Educational attainment was a significant predictor of the EQ-5D Anxiety/Depression domain severity rating (p=.0025). The cumulative probability of increased anxiety/depression severity ratings was significantly greater for those with a college or graduate education (OR=2.73) compared to those with high school education, and did not differ

for those with less than high school education. The individual regression coefficients for the other EQ-5D dimensions such as Self-care, Usual Activities, and Pain/Discomfort dimensions were not evaluated, because the models suggested that the studied socio-demographic variables did not significantly contribute to their predictive ability.

The average number of chronic medical conditions (mean \pm SD) in the disabled, retired, unemployed, and employed groups was 4.8 ± 1.8 , 4.8 ± 1.9 , 4.0 ± 1.4 , and 4.3 ± 0.6 , respectively ($p=0.66$). The EQ-5D_{Index} scores differed according to the number of chronic medical conditions for the 3 groups (0–3, 4–6, 7+) among the disabled and retired groups only (all $p < 0.01$). However, no differences were observed in EQ-5D_{VAS} scores according to either employment ($p=0.10$) or number of chronic medical conditions ($p=0.61$) (Table 5).

Discussion

To our knowledge, this is the first study to provide important insight into self-perceptions of health status and HRQoL in veterans who consider themselves disabled by their limited ability to ambulate when evaluated in an out-patient powered wheelchair clinic. The survey sample is representative of the veteran patient population commonly encountered in our clinics. They usually are elderly (69.4 ± 10.7), male (96.4%), with few college graduates (39%), mostly married (58%), either retired (54%) or disabled (39%), and a high percentage are current smokers (33%). A majority of them reported “some problem/moderate problem” with mobility (85%), self-care (62%), usual activities (61%), or pain/discomfort (57%), with almost half reporting current anxiety/depression (47%). We were not surprised that limited ambulation ability emerged as the overriding concern of the veterans, given they were being evaluated in the powered wheelchair clinic. However, this does highlight how limited mobility impacts their ability to perform self-care and usual day-to-day activities such as work, housework, and leisure.

This study suggests that although socio-demographic variables such as age, education, marital status, employment, underlying chronic medical conditions, and smoking habits are known to cumulatively impact the HRQoL, these variables were not associated with health state or HRQoL based on the EQ-5D questionnaire in this sample of veterans. Rather, these findings suggest that the number of chronic medical conditions is predictive of HRQoL, with lower HRQoL scores associated with increasing number of chronic medical conditions. Similarly, veteran's who are ≤ 7 years of age and are disabled viewed their health state as being poor, with a lower score than veterans who are ≥ 70 years and retired. No relationship was found between the veterans perceived health state (EQ-5D_{VAS}) and HRQoL (EQ-5D_{utility}) scores.

The ordinal logistic regression model showed that employment status and number of chronic medical conditions predicted the mobility domain severity rating. Likewise, the level of education predicted Anxiety/Depression domain severity rating, with significantly greater Anxiety/Depression in college graduates, indicating that they were aware of the severity of their physical disabilities and consequent functional limitations.

The disabled group had the most chronic medical conditions and, not surprisingly, they perceived themselves as having poor HRQoL. Dolan defined quality of life as “the extent to which an individual's hopes and ambitions are matched and fulfilled by experience” [22]. Our study results suggest that veterans' disease burden and associated disability, in the presence of their current financial situation (employment state), social set-up, and the level of care-giver support received, profoundly affected how they perceived their health state and HRQoL.

The present study has several limitations. First, it was limited to the veteran population and thus it is difficult to generalize to the general population, as the sample comprised predominantly white men, who were smokers, and have easy access to quality care. Second, since this was a hospital-based survey of veterans with limited ability to ambulate and who were dependent on their care-givers to help them ambulate and in some for their activities of daily living, we encountered moderate/severe problem responses and therefore an overestimation of their poor health state and related poor HRQoL than might exist in the usual veteran or general population. Third, it was a retrospective analysis, with resultant inherent bias. Fourth, the data was based on a single encounter with each participant. Despite these limitations, the data provided by the standardized EQ-5D questionnaire is a rich dataset for use in understanding the health status of the veteran population being served.

Implications for clinical practice

This data has helped us to inform our primary care physicians how best to manage several common co-morbidities observed in veterans to improve veterans' health state and HRQoL. Second, it also informs hospital administrators regarding the qualitative value of understanding veterans' health states and the value of judicious resource allocation to help decrease disease burden.

Conclusions

Of the various socio-demographic variables we considered, only age, employment status, and number of chronic medical conditions were associated with health state and HRQoL. Specifically, the number of chronic medical conditions,

employment state, and level of education were predictive of mobility and anxiety/depression domains severity ratings on

the EQ-5D questionnaire. No relationship was found between the veteran's health state and perceived HRQoL.

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