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Reliability and validity of World Health Organization Quality of Life-100 in homeless substance-dependent veteran population

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Abstract—The number of homeless individuals and specifically homeless veterans is increasing. Accurate assessment of quality of life is an important need in working with this population because of the myriad problems encountered. However, the reliability and validity of quality-of-life instruments have not been assessed in this population. This study evaluated the psychometric properties of the U.S. version of the World Health Organization Quality of Life-100 in a homeless veteran population. Results found adequate internal consistency for all domain and most facet scores, while test-retest stability varied for the facet scores. We confirmed validity by using subsamples with physical, emotional, and social problems and by comparing scores from populations that returned to the community with employment and housing. Limitations and directions for future study are discussed.

Key words: homeless veterans, mental health, Personality Assessment Inventory, psychometrics, quality of life, rehabilitation, substance dependence, VA, WHOQOL-100, World Health Organization.

INTRODUCTION

The increased focus on "recovery" of those with mental health diseases and addictions has moved attention away from solely symptom abatement. Important rehabilitation variables such as employment, housing, social relationships, and overall quality of life (QOL) are becoming important outcome variables for treatment. The homeless population encompasses many of these pressing needs. Though multiple definitions of homelessness exist, what is agreed upon is that homelessness is a significant problem that affects society. Numbers from the Urban Institute suggest that 3.5 million people experience homelessness during a given year [1]. The National Survey of Homeless Assistance Providers found that between 640,000 and 840,000, more than 10 percent of the nation's people living in poverty, were homeless on several predetermined nights [1]. Though astounding, the number of homeless veterans is disproportionately higher.

Numbers from the U.S. Department of Veterans Affairs (VA) CHALENG (Community Homelessness Assessment, Local Education, and Networking Groups) Report estimated that 194,254 U.S. veterans are homeless in any given year and veterans comprise approximately 20 to 30 percent of the homeless population [2]. The cost of caring for homeless veterans is high. In 2000, approximately $152 million were allocated to direct assistance

Abbreviations: DOM-RRTP = Domiciliary Residential Rehabilitation and Treatment Program, ICC = intraclass correlation coefficient, OIF/OEF = Operation Iraqi Freedom/Operation Enduring Freedom, PAI = Personality Assessment Inventory, QOL = quality of life, SD = standard deviation, SF-36 = 36-Item Short Form Health Survey, VA = Department of Veterans Affairs, WHOQOL-100 = World Health Organization Quality of Life-100.

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for homeless veterans. This amount does not include incidental medical care secondary to a homeless lifestyle (e.g., dental care, effects of malnutrition, diabetes, and incidents related to exposure to elements).

Also of increasing concern is that returning veterans from Operation Iraqi Freedom/Operation Enduring Freedom (OIF/OEF) are at a high risk for homelessness because of their young age and limited job skills. Numbers from the Northeast Program Evaluation Center report that 9.5 percent of veterans in homeless Domiciliary Residential Rehabilitation and Treatment Programs (DOM-RRTPs) in fiscal year 2006 were from Persian Gulf war eras [3]. Further, VA numbers indicate that more than 73,000 of the 205,000 OIF/OEF veterans seeking VA services have possible mental health disorders, 34,000 with symptoms related to trauma. With the high association between mental illness and/or substance abuse and homelessness, the number of homeless veterans who served during the current conflicts will likely increase.

As a result of homeless veterans' desperate living conditions, the need for accurate assessment of QOL is most critical in this marginalized group. Accurate and appropriate measurement of QOL is critical to determining the effectiveness of programs. However, because of the multiple needs and program types for homeless individuals, tools are needed that can be used across different types of programs with different identified goals and that do not impose artificial criteria for success. Surprisingly, with the high cost of services and magnitude of the problem, little focus has been given in the United States to validating QOL instruments for this population.

The World Health Organization developed the World Health Organization Quality of Life-100 (WHOQOL-100) [4–5] as a cross-cultural way of assessing QOL separate from a specific disease. Defining QOL as an "individual's perceptions of their position in life in the context of the culture and value systems in which they live, and in relation to their goals, expectations, standards, and concerns" [4], the WHOQOL-100 allows the respondent to determine his or her satisfaction while limiting constraints from cultural expectations or developer biases. Comprised of 100 items, the WHOQOL-100 is divided into 24 facets that make up 6 domains: Physical Capability, Psychological, Social Relationships, Environment, Independence, and Spirituality. Additionally, 4 items are used to create a Global Index.

The WHOQOL-100 was developed in 15 international centers through the use of item creation, focus groups, and field tests. It has been translated into more than 20 languages. Alpha coefficients have been generally good. Ranges include >0.70 for all domains on the Hindi version [6], 0.72 to 0.82 for the Chinese version [7], and 0.64 to 0.84 for a Dutch outpatient sample [8]. Based on normative data from a healthy population, the U.S. version's internal reliability for domains was somewhat superior to other versions and ranged from 0.83 to 0.91 [9]. One factor that may have influenced the higher internal consistency was the original sample. The individuals in the sample were selected from the Seattle, Washington, area and described as predominantly Caucasian and well educated. In contrast, the reliability of the U.S. version was between 0.53 and 0.76 in an urban African-American population [10].

The WHOQOL-100 has been compared with other QOL instruments. Conventional scales such as the 36-Item Short Form Health Survey (SF-36), which has Physical Function, Role Physical, Bodily Pain, General Health, Vitality, Social Function, Role Emotional, and Mental Health subscales and focuses more on health-related QOL, have demonstrated significant convergence with the WHOQOL-100 and other medical and mental health scales [11]. However, scales based solely on medical and mental health may have limited utility in complicated rehabilitation populations for which assessment of environment and independence are important.

In order to assess the positive and negative effects of rehabilitation as patients progress from residential rehabilitation to independent housing, assessing more than a person's perception of his or her illness is important. The Environmental, Social, and Independence subscales of the WHOQOL-100 are likely to be of particular importance in rehabilitation populations given the unique goals of most rehabilitation programs (e.g., restoration of independence, improvement of daily life skills, and increased adaptive skills). Other scales do assess environmental aspects that are important to rehabilitation programs. Scales such as the well-established Lehman's Quality of Life Interview [12], the Quality of Life Enjoyment and Satisfaction Questionnaire [13], and the Quality of Life Questionnaire [14] contain subscales assessing environment, leisure, and social activities but fewer subscales for determining treatment goals. Further, because the WHOQOL-100 was developed and standardized to measure QOL across cultures and populations, it brings more flexibility to the comparison of programs and determination of patient needs.

Though the WHOQOL-100 is promising, to date, no psychometric data have been developed on any U.S. homeless populations. This study examines the reliability and validity of the WHOQOL-100 in a homeless veteran population.

METHOD

Participants

We enrolled 250 veterans with substance dependence in early remission. Participants were almost exclusively male (91%) and predominately African American (59% African American, 34% Caucasian, and 7% Hispanic and other). The mean ± standard deviation (SD) age was 46 ± 6 years. Ninety percent were single, divorced, or widowed. Forty-three percent met criteria for a non-substance-related Axis I psychiatric disorder (72% depressive disorder, 15% combat-related posttraumatic stress disorder, 7% schizophrenia, 13% bipolar, and 14% other). The average length of homelessness before assessment was 40.8 months.

Recruitment Unit and Population Description

The VA North Texas Health Care System's DOM-RRTP is an active rehabilitation program for veterans who are homeless. The program has 40 beds in its Dallas facility. Rehabilitation within the program generally means that the veteran moves to an increased level of independence and in most cases returns to work and obtains housing. The DOM-RRTP addresses a variety of problem domains, including psychiatric and medical health, substance dependence, unemployment, financial and legal difficulties, and strained family relationships. Patients participate in 5 weeks of classes and groups that typically occur in the afternoon and evenings and 4 to 5 weeks of work reintegration therapy in the mornings. Patients are provided with a variety of classes, therapies, and experiences that are used to build and practice lifestyle skills. These classes include job readiness and preparation, extensive occupational and recreational therapy, relaxation training, and process group therapy. Further, basic independent living skills such as budgeting and cooking classes are available. Frequent community recreation and leisure activities are also incorporated into the schedule. Before coming to the DOM-RRTP, all patients must have negative urine drug screens for 2 weeks before admission.

Procedures

Veterans participating in the DOM-RRTP volunteered to take part in the study. A subsample was followed throughout treatment and were administered WHOQOL-100s every 2 weeks until discharge. Additionally, some veterans received psychological evaluations that included the Personality Assessment Inventory (PAI) [15].

RESULTS

Reliability of WHOQOL-100

Domain Scores

As part of the intake procedures for this VA-funded research project, 250 homeless veterans completed the WHOQOL-100. We used Cronbach α coefficients to compute reliability for each of the six domains. The generally accepted standard of >0.70 for reliability coefficients was required for sufficient internal consistency. **Table 1** presents the α coefficients for the six WHOQOL-100 domains. Consistent with the U.S. version's published figures [9], the domains demonstrated sufficient internal consistency, with α coefficients exceeding 0.80 for all WHOQOL-100 domains.

Test-retest reliability was assessed to determine the stability of scores over a brief time period. A subsample of 45 homeless veterans repeated the WHOQOL-100, with a mean interval of 2 weeks. Intraclass correlation coefficients (ICCs) assessed stability. The ICC was chosen both because it was the procedure used in the U.S.-evaluated samples [9] and because it allowed us to assess true stability by treating changes within an individual's

Table 1.
Reliability of World Health Organization Quality of Life-100 domain scores for homeless veteran population.

Domain	No. of Items	Coefficient α^*	ICC† (2-week interval)
Physical	12	0.91	0.78
Psychological	20	0.93	0.79
Independence	16	0.93	0.85
Social	12	0.87	0.71
Environmental	32	0.92	0.75
Spiritual	4	0.91	0.78

*n = 250.
†n = 45.
ICC = intraclass correlation coefficient.

scores as error variance—a generally higher standard than Pearson product moment correlation. The 2-week time frame was the same as in the U.S.-evaluated samples [9]. Additionally, because of the unstable nature of the population, a longer time frame could reflect actual changes in living situation rather than instrument stability. As can be seen in **Table 1**, most ICCs were respectable, around or above 0.80. The exception was the Social domain, which demonstrated barely acceptable stability.

Facet Scores

The reliability of each of the 24 WHOQOL-100 facets was evaluated with Cronbach α and repeated testing (test-retest) of the same samples used to assess reliability of the domains. Though each facet contains only four items, as seen in **Table 2**, most were found to have sufficient internal consistency to warrant use independent of the larger domain.

Test-retest procedures were used to assess stability of the facets over time. Assessments had a mean interval of 2 weeks. As can be observed in **Table 2**, adequate stability was displayed for many of the facet scores. Notably, however, the facets comprising the Social domain were consistently low or unacceptable, a finding potentially caused by increased social engagement over the test-retest time frame.

Table 2.
Reliability of World Health Organization Quality of Life-100 facet scores for homeless veteran population.

Facet	Coefficient α^*	ICC† (2-week interval)
Physical Domain		
1: Pain & Discomfort	0.87	0.76
2: Energy & Fatigue	0.81	0.80
3: Sleep & Rest	0.91	0.82
Psychological Domain		
4: Positive Feelings	0.85	0.86
5: Thinking, Learning, Memory, & Concentration	0.85	0.86
6: Self-Esteem	0.81	0.80
7: Body Image & Appearance	0.82	0.81
8: Negative Feelings	0.89	0.84
Independence Domain		
9: Mobility	0.83	0.81
10: Activities of Daily Living	0.78	0.69
11: Dependence on Medication or Treatments	0.92	0.84
12: Working Capability	0.95	0.56
Social Domain		
13: Personal Relationships	0.66	0.64
14: Social Support	0.82	0.69
15: Sexual Activity	0.80	0.61
Environment Domain		
16: Physical Safety & Security	0.66	0.72
17: Home Environment	0.80	0.79
18: Financial Resources	0.79	0.71
19: Health & Social Care, Availability, & Quality	0.84	0.63
20: Opportunities for Acquiring New Information & Skills	0.81	0.71
21: Participation in & Opportunities for Recreation & Leisure	0.74	0.59
22: Physical Environment	0.71	0.72
23: Transportation	0.85	0.66
Spiritual Domain		
24: Spirituality/Religion/Personal Beliefs‡	0.91	0.78

*n = 250.
†n = 45.
‡Facet 24 is only facet in Spiritual domain.
ICC = intraclass correlation coefficient.

Validity of WHOQOL-100

The domain scores of the WHOQOL-100 were compared with responses to the PAI [15] for 51 homeless veterans. The PAI is a 344-item self-assessment of psychopathology, therapeutic needs, and interpersonal style. The PAI was normed on 1,000 U.S. census-matched individuals. The PAI uses *t*-scores (mean of 50, SD of 10), with 60 and above indicating the start of mild symptoms of the assessed construct.

To validate the WHOQOL-100, we compared the domain scores between veterans indicating medical problems (PAI Somatization scale score ≥60), depression (PAI Depression scale score ≥60), or poor social support (PAI Nonsupport scale score ≥60) with veterans without problems in these areas (PAI scale scores <60). Effect sizes were computed to compare magnitude of difference. We expected that those veterans identifying medical problems would have lower WHOQOL-100 Physical scores, those identifying problems with depression would have lower WHOQOL-100 Psychological scores, and those identifying problems with social support would have lower WHOQOL-100 Social scores.

As can be seen in **Table 3**, based on effect sizes, the general expectations were met. Interestingly, though the Physical domain had a very high effect size in those with physical problems, it was actually the second largest, with

Table 3.
Mean World Health Organization Quality of Life-100 domain scores for participants with physical, psychological, and social difficulties.

Problem Area Identified	Domain Scale	Problem Identified (mean ± SD)	Problem Not Identified (mean ± SD)	Effect Size
Physical		*n* = 23	*n* = 28	
	Physical*	37.0 ± 10.1	47.4 ± 8.1	1.17
	Psychological*	68.1 ± 15.2	80.9 ± 10.3	1.01
	Independence*	55.7 ± 12.1	70.1 ± 9.0	1.36
	Social*	31.8 ± 9.0	40.7 ± 8.5	1.03
	Environment	107.1 ± 17.7	109.2 ± 19.5	0.12
	Spiritual†	15.4 ± 3.8	17.0 ± 3.3	0.57
Psychological		*n* = 20	*n* = 31	
	Physical†	39.0 ± 10.9	45.0 ± 9.4	0.60
	Psychological*	65.4 ± 14.6	81.4 ± 9.7	1.35
	Independence†	58.7 ± 14.4	66.8 ± 10.5	0.67
	Social†	32.8 ± 9.0	39.2 ± 9.5	0.68
	Environment	102.6 ± 17.3	111.9 ± 16.6	0.55
	Spiritual*	14.8 ± 3.6	17.6 ± 3.3	0.83
Social		*n* = 20	*n* = 31	
	Physical†	40.5 ± 10.3	44.8 ± 10.1	0.43
	Psychological*	68.4 ± 13.7	82.1 ± 10.9	1.13
	Independence†	59.5 ± 12.8	68.0 ± 11.2	0.72
	Social†	32.5 ± 8.02	41.0 ± 9.4	0.99
	Environment	102.7 ± 17.0	114.0 ± 16.1	0.70
	Spiritual*	15.3 ± 4.1	17.7 ± 2.7	0.68

*$p < 0.01$.
†$p < 0.05$.
SD = standard deviation.

the Independence domain having the largest effect size. Though not specifically predicted, this finding may reflect limitations of independent functioning that are caused by physical problems but are of more concern than the physical problems themselves. In the area of psychological problems, those who identified depression as a problem showed large effect sizes in the Psychological domain. In the area of social problems, the Psychological and Social domains demonstrated the largest effect sizes.

Additionally, a subsample of 19 veterans were assessed upon their admission to the DOM-RRTP and then after their return to the community following completion of the psychosocial rehabilitation program. All had obtained housing and financial support through either employment or disability income at the time of the second evaluation. Overall QOL was evaluated by the sum of all WHOQOL-100 items. Results revealed a significant difference, with veterans reporting better QOL while in the community than in a homeless program (mean = 373.5 and 355.9, respectively; $t(18) = 2.26$, $p < 0.05$).

DISCUSSION

The results support the use of the WHOQOL-100 in a homeless population. Findings indicate good reliability and validity for the domain scores. Internal consistencies were above 0.80 for all domains and above 0.70 for most facets. These results were encouraging considering the unstable nature of the population and the potential for significant life changes in short time periods that homeless individuals frequently encounter. Overall, the WHOQOL-100 is an acceptable assessment tool for working with homeless veterans.

The WHOQOL-100 offers a significant improvement for rehabilitation services over other assessments of life quality. First, the WHOQOL-100 is not anchored to a specific disease or condition. Well-used instruments such as the SF-36 and its scales focus on health-related QOL, while the WHOQOL-100 measures a more global construct of QOL [16]. This change moves the focus of QOL from predominately symptom abatement and/or health

assessment to a more encompassing view. This change in focus is not to minimize the importance of symptom abatement in rehabilitation. However, a broader view of rehabilitation implies more than medical treatment, with the goal being more independence, satisfying social relationships, and safe and supportive living environments. The WHOQOL-100 allows for this broader assessment. Second, the WHOQOL-100 can be used to track long-term satisfaction in order to evaluate QOL across rehabilitation and follow-up, allowing nonmedical domains to be tracked once symptoms have reduced. With its ability to be used across domains, the WHOQOL-100 can be useful for following inpatient rehabilitation progress into outpatient rehabilitation and maximally independent living. Finally, the high number of reliable facets included in the WHOQOL-100 allow more targeted rehabilitation planning. While the knowledge that a veteran is dissatisfied with "Environment" is important, determining whether this dissatisfaction comes from financial concerns, limitations in transportation, or lack of recreational opportunities, for example, allows resources to be directed toward goals important to the veteran.

The data also demonstrate the broad impact specific problem areas can have across QOL. For example, those who identified medical problems had poorer QOL scores in all domains, the lone exception being Environment, which was expected to be similar because all veterans lived in the same program. This finding may imply that physical problems affect multiple areas, causing perhaps higher depression and less social engagement and resulting in lower Psychological and Social Quality scores. An alternative explanation is that an underlying factor such as general dissatisfaction may artificially lower responses across most domains. Clarification of this issue and ways to account for these factors, if needed, should be evaluated in future studies.

This study has limitations. The first is the generalizability to other homeless populations, since we relied on a veteran population. Military service may have provided many with skills not readily developed by nonveterans (e.g., leadership, flexibility). Second, veterans, at least in our urban setting, have available many rehabilitation services not accessible to nonveterans. These factors may affect the norms and comparisons made in this study. Third, most of the population surveyed was male and whether the statistics would be similar with a female population is unclear. Finally, the veterans selected were entering or attempting to enter a veteran's DOM-RRTP that likely undersampled veterans in more severe situations, such as veterans unaware of services, living in very isolated areas, and/or too impaired to seek help on their own. Though those surveyed demonstrated the same full range of mental health and substance problems seen in nonveteran populations, future studies should include additional homeless populations.

CONCLUSIONS

The assessment of QOL is critical for the treatment of homeless populations. Too frequently, services for homeless veterans focus merely on providing basic services such as food and housing, with numbers-served as a measure of outcome. These services frequently have a self-congratulatory aspect such that the individual's opinion of improvement in life situation is not assessed. Programs must take a broader approach, measuring QOL and the impact of offered services. This focus will provide better information as to how the services are perceived and used. An important focus for future studies should be the influence of QOL on stability in the community and the development of risk models that identify critical foci of discharge planning.

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