Health-related Quality of Life for Adults Participating in Outpatient Substance Abuse Treatment

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Interest exists in assessing health-related quality of life as one aspect of treatment effectiveness with substance abuse clients. The SF-36 Health Survey is a self-report measure assessing subjective health status along physical and mental health dimensions. Subjects were 252 adults in an outpatient, randomized clinical trial for substance abuse treatment. Subjects reported significantly more impairments in functioning when compared to U.S. population norms, but differences disappeared after three months of treatment. There was little support that quality of life functioning was significantly related to substance use during treatment. Results highlight the importance of using the SF-36 to facilitate treatment planning. (Am J Addict 2003; 12:198–210).

Today, there is a great deal of interest in health-related quality of life indicators as important measures of treatment effectiveness and patient satisfaction. Ware stated that “In addition to traditional measures of survival, clinical endpoints, and disease-and-treatment specific symptoms and problems, the law mandated measures of functional status and well-being and patient satisfaction.” (p. 327–328)

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and effectiveness of new treatments. Measuring changes in quality of life, such as physical, mental, and social health, can provide a common yardstick to measure outcomes and determine the human and financial costs and benefits of new interventions. In the medical field, assessing quality of life involves more than a simple description of a patient’s health; rather, quality of life is seen as how patients perceive and react to their health status as well as to other nonmedical areas of their lives.

Since the early 1980s, there has been an explosion of studies and reviews that have focused on quality of life issues in the health care field. However, relatively little has been done in the addictions field to integrate health-related quality of life into the assessment of outcomes. This is surprising, given the long-standing awareness that individuals with addiction problems typically have a host of physical, emotional, and role functioning problems as a result of their substance use.

Longabaugh et al. emphasized that traditional definitions of outcome for alcoholism treatment generally focus on whether the subjects are drinking or not. One would expect that reductions in alcohol use would be related to improvements in other areas of quality of life, such as general physical health, social role, and emotional functioning. However, results have been inconclusive. Reviews of the literature on alcoholism have shown that alcoholics often fail to improve in other life areas even after reducing or stopping use and that alcoholics can achieve improved life circumstances even without abstinence. Also, some studies have shown a weak relationship between substance use and other life functioning. Longabaugh et al. note that this issue has not been resolved empirically or conceptually.

Longabaugh and colleagues do provide a well-articulated, conceptual model for assessing health-related quality of life in alcohol treatment research. The authors begin by defining alcoholism-related quality of life as:

...the totality of characteristics of the way of life of an individual or group with a particular reference to (1) clinical status with respect to substance use, (2) problems specific to the disorder, and (3) generic health measures focusing on general functioning and health perceptions usually valued regardless of a person’s age or health state (p. 120).

Further, Longabaugh et al. define the clinical status of an individual with respect to substance use as including the frequency, amount, and pattern of substance use. Disorder-specific problems are consequences the individual experiences that are specifically attributed to his/her substance use. Finally, the area of general functioning includes both physical, psychological, and social role functioning.

A myriad of instruments are available today to measure health-related quality of life functioning in patients with medical and/or psychiatric conditions. A few of these measures have been used with addictions populations, and the SF-36 would appear to be a useful measure of general functioning according to the conceptual model of Longabaugh and colleagues. In the addictions field, results from the literature using the SF-36 suggest the following in relation to Longabaugh’s quality of life model:

Clinical status: With both clinical and family practice samples, studies have reported that the severity of alcohol diagnosis is related to quality of life functioning. Results suggest that individuals with alcohol dependence have lower quality of life functioning than those with alcohol abuse diagnoses.

Disorder-specific problems: There is some evidence that the consequences of alcohol use are related to quality of life functioning,
Two studies have reported that clients experiencing more alcohol-related consequences tended to have significantly poorer functioning.\textsuperscript{17,19}

General functioning: When compared to population norms, clinical populations show significantly lower health-related quality of life functioning. These differences exist across a wide range of functioning, especially in psychological and social role-functioning dimensions.\textsuperscript{20–23} The role of comorbid psychopathology has been important in assessing health-related quality of life functioning for individuals with alcohol problems. After the effects of psychiatric comorbidity were controlled, the effect of having an alcohol disorder was not associated with poorer quality of life functioning.\textsuperscript{19,24,25}

To date, there are some striking limitations in the studies of health-related quality of life in the addictions field. In particular, most studies have focused on populations with alcohol problems. We found only three published studies that have examined quality of life functioning in drug abuse samples. Ryan and White\textsuperscript{22} studied clients enrolled in a methadone maintenance program in Australia. In the U.S., Garg et al.\textsuperscript{21} examined a mixed alcohol and drug sample from a psychiatric treatment center, while Stein et al.\textsuperscript{23} examined the reliability of the SF-20 (a shortened version of the SF-36) in a mixed alcohol and drug abuse treatment-seeking population.

In addition, little is known about the quality of life functioning in United States substance abuse treatment populations, as most studies of clinical populations have been conducted outside the U.S.\textsuperscript{16,17,20,22,26} Exceptions are the studies by Garg and colleagues\textsuperscript{21} and Stein et al.\textsuperscript{23} In Garg et al., the authors suggest that women and patients treated in an in-patient detoxification program experienced higher levels of mental health impairment, as measured by the SF-36, at the beginning of treatment. Results in the Stein et al. study suggest the SF-20 was a reliable measure with a mixed alcohol and drug treatment population.

Finally, we found only one study that examined changes in quality of life functioning over the course of substance abuse treatment.\textsuperscript{21} Garg and colleagues did examine changes in SF-36 scores after six months of treatment. Results suggested no significant improvements in physical component summary scores but significant improvements in mental component summary scores after six months of treatment. In the Garg study, the authors did not examine the relationship between reductions in substance use and improvements in SF-36 scores after six months.

In this study, we hope to address some of the limitations of the health-related quality of life literature mentioned above. Specifically, this study will address the following objectives:

1. To compare health-related quality of life between adults entering outpatient alcohol and drug treatment and U.S. population norms.
2. To assess changes in subjects’ health-related quality of life after 3 months of substance abuse treatment.
3. To examine the relationship between reductions in substance use, at the end of treatment, and improvements in health-related functioning.

**METHODS**

Participants

Participants were 252 individuals seeking treatment as part of a substance abuse treatment dissemination study. Two methods were used to recruit participants. One method consisted of recruiting participants (n = 149) from an intensive outpatient, community-based substance abuse treatment program located in central...
New Jersey. The second method consisted of recruiting participants \((n = 103)\) from various community venues through media advertisements and community referrals. See Morgenstern, Blanchard, Morgan, Labouvie, and Hayaki\(^{27}\) for a more complete description of the methods used in this study.

**Eligibility Criteria.** The selection criteria, as designed for the substance abuse treatment dissemination study, aimed to identify a representative group of substance-abusing patients seeking community outpatient treatment who could benefit from cognitive behavioral treatment and whose life circumstances would not interfere with study participation. Patients were eligible for the study if they were at least eighteen years old, met a DSM-IV substance use disorder diagnosis in the prior twelve months, used substances at least once in the sixty days prior to recruitment, expressed a willingness to attempt to quit rather than simply reduce their use, evidenced geographical stability, had at least a sixth-grade reading level, and were able to provide a collateral who could locate their whereabouts.

Patients were excluded if they met any of the following conditions: regular use of intravenous drugs in the prior six months; received more than seven days of inpatient or less than two weeks of intensive outpatient treatment in the prior month; received methadone, Antabuse, or naltrexone; were grossly cognitively impaired; were currently psychotic; posed an imminent suicide or homicide risk; had a life threatening or unstable medical condition; or for whom incarceration was impending.

**Measures**

*The SF-36 Health Survey (SF-36)*. The SF-36 is a self-report, global measure of health-related quality of life that measures current health status in eight domains: general health, mental health, pain, physical role functioning, social role functioning, role limitations due to physical problems, role limitations due to emotional problems, and vitality. According to the authors, these domains were selected as representative of those most frequently measured in health surveys and as most sensitive to treatment-related change in functioning.\(^{28}\) See Table 1 for a brief description and sample items within each domain.

All scores were calculated based on scoring algorithms detailed in the user’s manual.\(^{29,30}\) For each of the eight subscales, transformed scores range from 0 to 100 and represent the percentage of the total possible score that can be achieved. Higher transformed scores indicate higher quality of life functioning.

The SF-36 has been shown to have good reliability and validity.\(^{29,30}\) In addition to the SF-36’s psychometric strengths, it is quick, easy to administer, and has population norms for a wide range of medical (including psychiatric) conditions.

*The Time-Line Follow-back Interview (TLFB)*.\(^{31}\) The TLFB was used to assess alcohol and drug use for the six months prior to treatment entry and three months of treatment to determine the percentage of days alcohol and drugs were consumed (actual days of use divided by days of possible use).

*Addiction Severity Index: Alcohol and Drug sections (ASI)*.\(^{32}\) Composite scores were calculated to assess alcohol and drug severity over the past thirty days. The alcohol and drug composite scores were combined to provide an overall substance use severity composite score and could range from 0.0 to 2.0.

*The Structured Clinical Interview for DSM-IV (SCID)*.\(^{33}\) Substance use diagnoses were assessed using the alcohol and drug
sections of the SCID. In the case of diagnoses for more than one substance, primary substance use diagnosis was determined by taking the substance for which subjects met the greatest number of dependence symptoms.

*Addiction Severity Index: Psychiatric Section (ASI)*32. Current psychiatric status was measured by using composite scores from the Addiction Severity Index. Composite scores can range from 0.0 to 1.0, with higher scores indicating poorer status.

**Procedures**

After participants consented to the study, they completed a 2–4 hour baseline assessment. Participants were then randomly assigned to one of three study treatment conditions consisting of twelve individual sessions taking place over a 13-week period. Participants received an

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**TABLE I. Descriptions and Alphas for the SF-36 Health Survey Subscales (n = 250)**

<table>
<thead>
<tr>
<th>SF-36 Subscale</th>
<th>Number of Items</th>
<th>Description of SF-36 Subscales*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Functioning</td>
<td>10 items (Alpha = .92)</td>
<td>Extent health limits physical activities. “Does your health limit you in lifting or carrying groceries, walking . . .?”</td>
</tr>
<tr>
<td>Role-Physical</td>
<td>4 items (Alpha = .85)</td>
<td>Extent physical health interferes with work/regular activities. “Have you cut down on time, accomplished less, or had difficulty with work or other activities?”</td>
</tr>
<tr>
<td>Body Pain</td>
<td>2 items (Alpha = .86)</td>
<td>Intensity of pain and effects of pain on normal life. “How much body pain and how much did it interfere with work?”</td>
</tr>
<tr>
<td>General Health</td>
<td>5 items (Alpha = .75)</td>
<td>Evaluation of current health outlook. “In general, how is your health? Do you expect your health to get worse?”</td>
</tr>
<tr>
<td>Vitality</td>
<td>4 items (Alpha = .72)</td>
<td>Assessing levels of energy/vitality. “Do you feel tired or worn out? Do you have a lot of energy and feel full of pep?”</td>
</tr>
<tr>
<td>Social Functioning</td>
<td>2 items (Alpha = .65)</td>
<td>Extent physical/emotional problems interfere with social activities. “Health/emotional problems interfered with activities with family, friends, neighbors, or groups?”</td>
</tr>
<tr>
<td>Role-Emotional</td>
<td>3 items (Alpha = .80)</td>
<td>Extent emotional problems interfere with activities. “Have you . . . not worked as usual with your work or regular activities?”</td>
</tr>
<tr>
<td>Mental Health</td>
<td>5 items (Alpha = .83)</td>
<td>Extent individuals experience depression, anxiety, and general positive affect. “Have you felt downhearted or blue?”</td>
</tr>
</tbody>
</table>

*Scores range from 0–100. Higher scores indicate better functioning.*

in-person follow-up thirteen weeks after their assignment to treatment. All participants were followed once randomized regardless of their participation in study treatments. By the end of treatment, 203 subjects completed the SF-36 for a follow-up rate of 81%. The study design and treatments are described in more detail in Morgenstern, Blanchard, Morgan, Labouvie, & Hayaki.27

Data Analyses

Baseline scores on the SF-36 were compared to scores of a U.S. normative sample provided in the SF-36 scoring manual.28 Independent sample t-tests were used to compare the SF-36 scores from the U.S. normative group and study treatment sample. Effect sizes of the differences between the two groups were also calculated; small (.20–.49), medium (.50–.79), and large effects (> .80) were defined according to Cohen.34

Identifying changes in quality of life over the course of treatment was accomplished by comparing pre- and post-treatment scores on the SF-36. Differences between baseline and end of treatment SF-36 scores were examined by performing dependent measures t-tests and calculating effect sizes. In addition we categorized participants as “impaired” on the eight SF-36 subscales if the participant’s score fell below the 25th percentile, based on the U.S. norms. We believed using these impairment groups would be more meaningful for identifying problems in quality of life functioning than using a continuous measure. Defining participants as impaired, using the 25th percentile, was based on previous work by Danzinger et al.35 as well as criteria provided in the SF-36 manual. In order to examine the relationship between end of treatment SF-36 functioning and substance use during treatment, we used Pearson correlation and logistic regression analyses. In the regression analyses, we used the end of treatment impairment status as the dependent variable and entered the baseline impairment status and the within treatment percent days abstinence. Due to the skewed distribution for the percent days abstinence variable, we log transformed the substance use data and used this variable for all subsequent analyses.

RESULTS

Sample Characteristics

Of the total sample (N = 252), 37.7% were female, 51.4% were African American, 75% were unmarried, 75.4% had at least graduated high school, 47.2% were employed, and the median family income was $25,000–29,000. The mean age of the sample was 35.9 (SD = 9.1). All participants met criteria for a DSM-IV substance use disorder within the prior twelve months: 91.7% met criteria for at least one, and 33.7% met criteria for more than one dependence disorder. Participants were classified based on primary substance problem as follows: 41.3% (n = 104) alcohol, 36.1% (n = 91) cocaine, 16.3% (n = 41) heroin, 6% (n = 15) marijuana, and 4% (n = 1) sedatives. On average, participants met 5.6 (SD = 2.2) out of seven dependence criteria for their primary problem and used substances 45% (SD = 31.4) of days during the six months prior to treatment entry, and 63.5% had prior substance abuse treatment. Table 2 describes the total sample recruited for the study.

Confirmation of Self-report Data. Self-reported alcohol and drug use data were confirmed via a collateral interview and urine screens. The percent agreement between collaterals’ and subjects’ report of substance use was 93.2% (kappa = .73), and agreement between urine screens and self-reported use of any substance (defined as any outcome other than a positive urine screen, but
negative self-report) was 95% (kappa = 0.80). Thus, data suggest that self-report of substance use was, for the most part, valid in this study.

Comparison of SF-36 Functioning with a Normative Sample

Independent sample t-tests were conducted, and results showed that our sample scored significantly lower than the U.S. population norms on the Role-Physical, General Health, Vitality, Social Functioning, Role-Emotional, and Mental Health subscales of the SF-36. Using Cohen’s definition34 of effect sizes, the Role-Physical, General Health, and Vitality subscales showed small effects (.20–.49). Moderate effects (.50–.79) were seen for the Social Functioning and Role-Emotional subscales, while a large effect (> .80) was present for the Mental Health subscale (see Table 3).

Rates of Impairment at Baseline and End of Treatment

On each of the eight SF-36 subscales, participants were defined as impaired in functioning based on scoring below the 25th percentile on the U.S. norms. For the four physical functioning subscales, baseline rates of impairment ranged from 20.8% to 33.6% of the participant population. For the four mental health functioning

### TABLE 2. Participant Characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Total Sample (n = 252)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (mean ± SD)</td>
<td>35.9 ± 9.1</td>
</tr>
<tr>
<td>Gender (percent female)</td>
<td>37.7%</td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>37.4%</td>
</tr>
<tr>
<td>Black</td>
<td>51.4%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>10.0%</td>
</tr>
<tr>
<td>Asian</td>
<td>1.2%</td>
</tr>
<tr>
<td>Education level (high school or greater)</td>
<td>75.4%</td>
</tr>
<tr>
<td>Marital status (married/living as married)</td>
<td>25.0%</td>
</tr>
<tr>
<td>Employment status (employed full/part-time)</td>
<td>47.2%</td>
</tr>
<tr>
<td>Family income</td>
<td>$25–29K</td>
</tr>
<tr>
<td>Primary substance problem Alcohol</td>
<td>41%</td>
</tr>
<tr>
<td>Cocaine</td>
<td>36%</td>
</tr>
<tr>
<td>Other</td>
<td>23%</td>
</tr>
<tr>
<td>Percent use days</td>
<td>45.0 ± 31.4</td>
</tr>
<tr>
<td>Drinks per drinking day*</td>
<td>13.0 ± 11.0</td>
</tr>
<tr>
<td>ASI alcohol severity score*</td>
<td>0.52 ± 0.21</td>
</tr>
<tr>
<td>Years regular drinking*</td>
<td>14.8 ± 10.6</td>
</tr>
<tr>
<td>ASI drug severity score†</td>
<td>0.22 ± 0.09</td>
</tr>
<tr>
<td>Years regular drug use†</td>
<td>9.76 ± 6.58</td>
</tr>
<tr>
<td>Prior substance abuse treatment</td>
<td>63.5%</td>
</tr>
</tbody>
</table>

*These means were computed for participants who had alcohol as their primary substance of use (n = 104).
†These means were computed for participants who had a drug as their primary substance of use (n = 148).
subscales, rates of impairment ranged from 35.2% to 62.4% of the participants.

At the end of treatment, rates of impairment were reduced on all eight SF-36 subscales (see Table 4). For the four physical functioning subscales, end of treatment rates of impairment ranged from 17.2% to 21.2% of the participant population. For the four mental health functioning subscales, rates of impairment ranged from 16.7% to 36.0% of the participants. On all SF-36 subscales, rates of baseline impairment were not significantly different between participants who did and did not show up for the end of treatment follow-up.

Changes in SF-36 Functioning After Treatment

Dependent t-tests were conducted for the 199 participants that had both baseline and end of treatment SF-36 scores. Results

<table>
<thead>
<tr>
<th>SF-36 Health Survey subscales</th>
<th>Baseline (n = 250)</th>
<th>End treatment* (n = 203)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Functioning</td>
<td>20.8% (n = 52)</td>
<td>17.2% (n = 35)</td>
</tr>
<tr>
<td>Role-Physical</td>
<td>33.6% (n = 84)</td>
<td>17.2% (n = 35)</td>
</tr>
<tr>
<td>Body Pain</td>
<td>27.2% (n = 68)</td>
<td>20.7% (n = 42)</td>
</tr>
<tr>
<td>General Health</td>
<td>32.8% (n = 82)</td>
<td>21.2% (n = 43)</td>
</tr>
<tr>
<td>Vitality</td>
<td>35.2% (n = 88)</td>
<td>16.7% (n = 34)</td>
</tr>
<tr>
<td>Social Functioning</td>
<td>62.4% (n = 156)</td>
<td>36.0% (n = 73)</td>
</tr>
<tr>
<td>Role-Emotional</td>
<td>53.2% (n = 133)</td>
<td>30.3% (n = 61)</td>
</tr>
<tr>
<td>Mental Health</td>
<td>57.2% (n = 143)</td>
<td>31.0% (n = 63)</td>
</tr>
</tbody>
</table>

*Across all 8 SF-36 subscales, chi-square analyses revealed no significant differences in baseline impairment status between participants that did and did not appear for end of treatment follow-up.
for all eight SF-36 domains showed significant increases in functioning by the end of treatment (see Table 5). Effect size analyses also were conducted on the eight SF-36 subscales for baseline and end of treatment scores. Negligible effects were found for the Physical Functioning and Body Pain subscales. Small effects were found for the Role-Physical, General Health, and Vitality subscales while moderate effects were found for the Social Functioning, Role-Emotional, and the Mental Health subscales.

### Evaluating Changes in Substance Use as Related to End of Treatment Impairment Status

Logistic regression analyses were conducted to evaluate the relationship between substance use during treatment and end of treatment impairment status for participants on the SF-36 subscales. Separate logistic regression analyses were conducted for each subscale, entering the baseline impairment status for that subscale and the log transformed total percent days abstinent during treatment. Substance use during treatment was not significantly associated with end of treatment impairment status on any of the eight SF-36 subscales.

Additionally, we examined the relationship between substance use during treatment and the continuous scores from each of the eight subscales from the end of treatment SF-36. In only the Mental Health subscale was there a significant relationship between substance use during treatment and quality of life functioning. In the regression analysis, percent days abstinence during treatment and baseline Mental Health scores were entered and accounted for 28% of the overall variance in end of treatment Mental Health scores, ($F$ (2,195) = 38.99, $p < .0001$). Percent days abstinence during treatment accounted uniquely for 4.8% of the variance in end of treatment Mental Health scores.

### COMMENT

Consistent with reports from other studies using the SF-36 with substance use clinical

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### Table 5. SF-36 Health Survey Subscale Scores for Study Participants: Baseline and End of Treatment Scores

<table>
<thead>
<tr>
<th>SF-36 Health Survey Subscale</th>
<th>Baseline SF-36 Scores (n = 199) Mean (SD)</th>
<th>End Treatment SF-36 Scores (n = 199) Mean (SD)</th>
<th>Dependent Sample t-tests</th>
<th>Effect Sizes Baseline and End Treatment Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Functioning</td>
<td>83.78 (22.79)</td>
<td>87.31 (20.91)</td>
<td>$t = 2.37^\dagger$</td>
<td>0.16</td>
</tr>
<tr>
<td>Role-Physical</td>
<td>71.86 (37.26)</td>
<td>86.43 (28.72)</td>
<td>$t = 5.11^5$</td>
<td>0.44*</td>
</tr>
<tr>
<td>Body Pain</td>
<td>74.50 (23.03)</td>
<td>78.42 (21.70)</td>
<td>$t = 2.38^\dagger$</td>
<td>0.18</td>
</tr>
<tr>
<td>General Health</td>
<td>66.44 (20.06)</td>
<td>72.34 (19.43)</td>
<td>$t = 4.75^3$</td>
<td>0.30*</td>
</tr>
<tr>
<td>Vitality</td>
<td>53.74 (21.76)</td>
<td>63.02 (18.76)</td>
<td>$t = 6.82^3$</td>
<td>0.46*</td>
</tr>
<tr>
<td>Social Functioning</td>
<td>68.59 (26.02)</td>
<td>84.17 (20.00)</td>
<td>$t = 8.09^5$</td>
<td>0.68^\dagger</td>
</tr>
<tr>
<td>Role-Emotional</td>
<td>62.14 (41.12)</td>
<td>80.57 (33.37)</td>
<td>$t = 6.41^3$</td>
<td>0.49*</td>
</tr>
<tr>
<td>Mental Health</td>
<td>59.56 (21.31)</td>
<td>72.40 (18.80)</td>
<td>$t = 8.72^5$</td>
<td>0.64^\dagger</td>
</tr>
</tbody>
</table>

*p < .05.

$^\dagger$p < .0001.

$^\text{small effect size (.20-.49).}$

$^\text{medium effect size (.50-.79).}$

$^\text{large effect size (.80-}).$
populations\textsuperscript{19–22} our results show clients entering treatment reported significantly more impairment in most of the SF-36 health domains, especially in the mental and role functioning areas.

It was striking that the SF-36 scores from other treatment samples appeared substantially lower than our study sample. Due to different norm groups and a lack of statistical information in these studies, a statistical comparison of the effect size differences was not possible. The differences between the current sample and at least two previous studies\textsuperscript{20,22} could be attributed to the fact that the SF-36 was administered in different countries. Due to the popularity of the SF-36, the instrument has been translated into different languages and we are not aware of any published information about the comparability of the SF-36 across cultures. Also, in the Ryan and White study,\textsuperscript{22} the treatment sample could be considered having more severe problems in functioning, as they were treating methadone maintenance clients\textsuperscript{36,37}.

All SF-36 scale scores were substantially higher in our sample than those reported by Garg et al.,\textsuperscript{21} even though the levels of care for the two samples were comparable. However, the sample in the Garg study may have shown more impairment due to being recruited from a psychiatric hospital where psychiatric comorbidity may have had a greater influence on impairment. Additionally, the sample in the Garg study differed from our study sample on many demographic characteristics, such as age, gender, ethnicity, and employment.

After treatment, significant improvements in SF-36 scores were seen, and our study participant’s scores on all SF-36 subscales were no longer different from the U.S. population norms. Additionally, substantial decreases were seen in the rates of impairment across all SF-36 subscales, especially in the social, emotional, and mental health functioning domains.

Longabaugh et al.\textsuperscript{8} posed the question whether health-related quality of life is directly improved as a function of abstinence or reductions in alcohol and drug use. The results of this study offer data to answer this question. In our sample, although significant improvements in substance use outcome were seen, changes in alcohol and drug consumption were generally not significantly associated with changes in quality of life impairment status at the end of treatment. We found only a weak relationship between substance use during treatment and the continuous measure of mental health functioning.

There may be several explanations for these results. One explanation is that a relationship between substance use and impairment in quality of life is present but obscured due to the restriction of range in substance abuse outcomes. Within treatment substance use outcomes were extremely positive, as the mean percent days of abstinence from alcohol and drugs was 89\% (SD = 22.93). In addition, as McLellan et al.\textsuperscript{9} suggest, it may take longer periods of time for individuals with addictions problems to experience improvements, especially in social and role functioning. Thus, examining the relationship of quality of life functioning and substance use at follow-up points further away from the end of treatment may be a better test. For example, assessing participants six or twelve months after treatment will address the issue of restrictions of range in substance use outcomes. Additionally, assessing quality of life functioning after longer periods of time is likely to allow some individuals the needed time to repair social and role functioning impairments.

These results are consistent with conclusions from Emerick,\textsuperscript{12} Pattison,\textsuperscript{13} and McLellan et al.,\textsuperscript{9} which suggest there are differential effects for individuals within substance abuse treatment samples. For example, at the end of treatment in our study, between 44.3\%–51.6\% of the
subjects who were not impaired on SF-36 subscales were also using substances, while between 33.3%—55.9% of the subjects who were abstinent were still considered impaired. An individual’s current substance use may not be the only factor contributing to impairment in quality of life functioning. Additional factors such as the severity of substance use, length of substance use history, and/or other client characteristics (i.e. age, medical history, psychiatric history) may also play an important role in the impairment of functioning for individuals with addictions.

Finally, there may be other factors that are related to improvement in functioning beyond just abstinence from substances. As McLellan et al. point out, abstinence from substances may be necessary but not sufficient for improvements in other areas of life functioning. Other factors such as utilization of ancillary services (medical, psychiatric, vocational) and family and social support may help improve functioning even with substance use.

Using the continuous SF-36 scores, there typically was no significant association between substance use during treatment and quality of life functioning at the end of treatment. The sole exception was the continuous score on the Mental Health subscale: improvements in substance outcomes were significantly related to improvements in end of treatment Mental Health functioning. It may be that the mental health dimension is more responsive to reductions in use or abstinence from alcohol and drugs than other health-related quality of life dimensions. It is likely that the same change processes contributing to positive changes in substance use are also influencing changes in participant’s emotional health. It will be important to examine whether this improvement in mental health functioning is sustained over longer periods of time. Finally, it is not surprising that the relationship between substance use outcomes and mental health functioning was significant in the continuous measure and not in the dichotomous impairment variable. When compared to continuous variables, analyses using dichotomous variables will have weaker relationships due to the attenuation of the range. Since health-related quality of life functioning is generally not related to substance use, it would seem important to include the SF-36 as another indicator assessing treatment outcome.

**CONCLUSIONS**

Outcomes other than abstinence are important; in the health care field, there is more interest in assessing patient’s functional status, and well-being, as well as traditional disease-specific symptoms. Additionally, in the addictions field, it is becoming more and more evident that even with abstinence, many patients can continue to experience physical, social, and role functioning impairments. It will be important to assess these domains and provide appropriate treatment referrals where indicated.

The primary findings of interest in this study were that subjects entering substance abuse treatment reported significantly more impairments in health-related quality of life functioning than U.S. population norms. These differences are especially pronounced in the mental health and role functioning domains. Additionally, after a three-month treatment period, subjects showed significant improvements in their substance use as well as health-related quality of life functioning, particularly in the mental health domains.

For many years, there has been an interest in integrating health-related quality of life assessments into the health care field, although the literature in the addictions field has been particularly limited in the U.S. It will be important to conduct further research using psychometrically sound health-related quality of life
measures in clinical programs. In future studies, standard information on medical and psychiatric service utilization will need to be collected. It will be important to assess the contribution of client use of ancillary services to changes in quality of life functioning, as there may be important implications for treatment planning.

This study had several limitations in addition to those previously mentioned. Although our sample was fairly heterogeneous, the generalizability of our results is limited, as we excluded those clients who needed residential treatment, had severe psychiatric or organic impairment, or used drugs intravenously. Also, we examined quality of life functioning three months after treatment commenced. During treatment, significant improvements occurred in subjects’ substance use patterns and global functioning; at this time, we do not know whether these changes in quality of life will be sustained. An important contribution to the literature will be examining the changes of quality of life functioning over a longer period of time.

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