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Preference-weighted health-related quality of life measures and substance use disorder severity

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Abstract

Aims—Examine the validity of preference-weighted health-related quality of life measures in a sample of substance use disorder (SUD) patients. The implications of cost–utility analyses (CUAs) of SUD interventions are discussed.

Design—Cross-sectional analysis of subjects seeking SUD treatment.

Setting—Seven SUD treatment centers in a medium-sized Midwestern metropolitan area in the United States.

Participants—Data from 574 SUD subjects were analyzed from a study to test interventions to improve linkage and engagement with substance abuse treatment.

Measurements—Subjects completed the following preference-weighted measures: self-administered Quality of Well-Being scale (QWB-SA) and Medical Outcomes Study SF-12 (standard gamble weighted or SF-12 SG); and clinical measures: Addiction Severity Index (ASI) and a symptom checklist based on the DSM-IV.

Findings—In unadjusted analyses, the QWB-SA was correlated significantly with six of seven ASI subscales and the SF-12 SG was correlated with four of seven. In adjusted analyses, both preference-weighted measures were significantly correlated with diagnostic, physical health, mental health and drug use measures, but not with legal or alcohol use measures. The QWB-SA was also correlated with employment problems and the SF-12 SG was correlated with family/social problems.

Conclusions—This study generally supports the construct validity of preference-weighted health-related quality of life measures in SUD patients. However, the QWB-SA and SF-12 SG did not correlate with all ASI scales. Cost–benefit analysis may be preferable when policy-makers are interested in evaluating the full range of SUD intervention outcomes.

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Keywords

Cost-effectiveness analysis; cost–utility analysis; health-related quality of life; quality of wellbeing scale; SF-12 scale; substance use disorder

INTRODUCTION

Economic evaluations of substance use disorder (SUD) interventions report results infrequently in terms of cost per quality-adjusted life year (QALY) ratios. Cost–utility analyses (CUAs) such as cost per QALY ratios are more commonly reported for physical health and mental health interventions than SUD interventions. Economic evaluations of SUD interventions more commonly use variations on cost–benefit analysis (CBA), because SUD interventions often affect outcomes that are not accounted for typically in physical health or mental health CUAs such as criminal justice, crime victimization and illegal earnings [1].

Of those SUD interventions that did report cost per QALY ratios the majority were based on modeled data (probability and outcome estimates from the literature and expert opinion), not prospective data. For example, we are aware of only four published papers from three studies that reported prospective generic QALY data to evaluate SUD interventions: three using the EQ-5D [2–4] and one using the Assessment of Quality of Life instrument [5]. One heroin addiction study using the EQ-5D found a significant 12-month QALY difference between methadone plus heroin versus methadone alone group [3]. Another EQ-5D study found no significant difference between two active treatments for subjects with alcohol problems [4]. An AQoL study found no significant difference between two active treatments for heroin addiction [5]. The remaining SUD studies reporting QALY outcomes used modeled data and most evaluated the cost–utility of tobacco prevention and treatment programs [6–19]. Other studies used modeled data to evaluate the cost–utility of methadone and buprenorphine treatment for opiate addicts [20–22] and interventions for problem drinking and alcohol dependence [23,24].

Cost per QALY measures are particularly helpful when applying a common cost-effectiveness metric across a wide variety of different healthcare interventions. Generic QALY measures typically follow the World Health Organization definition of health (physical, mental and social health domains) [25] and combine both quantity of life and quality of life into a single measure [26]. The result is a preference-weighted score between death (0.0) and perfect health (1.0). Examples of generic QALY measures designed specifically for CUAs include the Quality of Well-Being scale (QWB) [27,28], Health Utilities Index [29], EQ-5D [30] and Assessment of Quality of Life (AQoL) [31]. Examples of health-related quality of life measures that were not designed initially for use in CUAs, but that can be converted to a preference-weighted index score, include the Medical Outcomes Study SF-36 and SF-12 [32,33].

The UK National Institute for Health and Clinical Excellence and the US Public Health Service Panel on Cost-Effectiveness in Health and Medicine recommended the use of generic QALYs based on a health-state classification system with preference weights assigned by the general public [26,34]. Because health-care resources are limited and numerous programs compete for the same pool of funding, competition for health-care resources will become increasingly data-driven [35]. If SUD programs are to compete for limited resources with other health-care interventions, the relationship between SUD outcomes and generic QALYs will become more important.

To address the relationship between SUD severity and generic QALYs, the present study (i) investigated the construct validity of two generic preference-weighted measures (the QWB-SA and SF-12) relative to SUD diagnostic and symptom severity; (ii) examined the relationship between preference-weighted scores for SUD patients and other patient groups; (iii) discussed hypothetical ranges of incremental costs and cost–utility ratios for SUD interventions; and (iv) outlined future research objectives to advance cost–utility analyses of SUD interventions. For simplicity, the QWB-SA and SF-12 standard gamble (SG) will be referred to as preference-weighted measures.

METHODS

Design

Data for this study were collected as part of a National Institute on Drug Abuse funded clinical trial, ‘Reducing Barriers to Drug Abuse Treatment Services’ (R01 DA15690). The objective of the clinical trial was to test the effectiveness of two interventions (motivational interviewing and strengths-based case management) compared to usual care on improving linkage and engagement with substance abuse treatment. These interventions took place in a centralized intake unit (CIU) in a medium-sized Midwestern metropolitan area. The CIU was the county’s only point of entry for all uninsured individuals seeking treatment for SUD and mental health problems.

Subjects were eligible for the clinical trial if they met the following criteria: (i) received a recent CIU assessment and referral; (ii) at least 18 years of age; (iii) received a clinical diagnosis of substance abuse and/or dependence using criteria from the DSM-IV-TR [36] (subjects with a clinical diagnosis of alcohol abuse or dependence only were not eligible); (iv) no clinical diagnosis of schizophrenia or any other psychotic disorder; and (v) referred to either residential, drug free out-patient or methadone maintenance treatment. The Wright State University Institutional Review Board approved the research protocol.

Subjects

Subjects ($n = 574$) were divided into four groups based on SUD diagnostic criteria: (i) those who did not meet life-time DSM-IV criteria for substance dependence and reported no problems related to substance use in the past 30 days ($n = 39$); (ii) those who did not meet life-time DSM-IV criteria for substance dependence but reported problems related to substance use in the past 30 days ($n = 12$); (iii) those who did meet criteria for life-time substance dependence without problems related to substance use in the past 30 days ($n = 133$); and (iv) those who did meet criteria for life-time substance dependence with problems related to substance use in the past 30 days ($n = 390$). The second group ($n = 12$) was not included in statistical comparisons in Tables 1 and 3 because of small n .

Measures

At baseline, all subjects completed an interviewer-administered interview, including a substance abuse severity questionnaire (Addiction Severity Index ASI) and two health-related quality of life questionnaires: self-administered QWB-SA and standard gamble-weighted SF-12 SG. We chose the QWB-SA (a longer instrument) because it included a wide range of symptoms and functional impairments. We chose the SF-12 (a shorter instrument) because it is used widely in many settings. Extensive SUD data were collected, including specific symptoms of substance abuse and substance dependence as defined by the DSM-IV [36]. All instruments were read to subjects in order to account for varying reading levels and to minimize missing data.

ASI—The ASI is designed to evaluate the nature and severity of problems associated with SUDs [37]. The ASI is interviewer-administered and focuses on seven functional domains that are associated commonly with SUDs: medical, employment, alcohol use, drug use, legal, family/social and psychiatric. We report mean composite scores in each domain for the past 30 days, which range from 0 (no problem) to 1.0 (extreme problem).

SF-12 mental and physical health component summary scores—The SF-12 is a 12-item subset of the Medical Outcomes Study SF-36. The SF-12 provides two outcome measures: the mental health component summary (MCS) and physical health component summary (PCS) scores [38]. The SF-12 MCS and PCS achieved R^2 values greater than 0.90 when cross-validated with the SF-36 [38].

SF-12 SG—Brazier and colleagues developed methods for converting SF-36 and SF-12 data into a quality-adjusted health index using preference-weighted methods [32,33]. The available preference weight conversion formulas are based on visual analog scale (VAS) [32] and standard gamble (SG) [33] methods. We used the SG conversion formula because the SG method is more consistent with expected utility theory than the VAS [39]. The SG method for obtaining preference weights includes a choice between two options. One option is to stay in a given health state and the other option includes accepting a treatment that will result in varying probabilities of death or perfect health. The probabilities for death and perfect health are altered systematically until the respondent is indifferent between the two options. The preference weight for the health state is equal to the probability of perfect health at the choice where the respondent was indifferent between the two options.

Brazier and colleagues used three steps to derive the SG preference-weighted conversion formulas: (i) simplify the SF-36's health state classification system into six dimensions (SF-6D); (ii) obtain preferences for SF-6D health states by primary data collection; and (iii) estimate the preference weights for each level of impairment within the six dimensions of the SF-6D using regression models [32,33]. The six dimensions included: physical functioning, role limitations due to physical health or emotional problems, social functioning, pain, mental health and vitality. The SG preference weights were derived from a general population sample of 611 subjects. The SG preference weight conversion formula transforms SF-12 data into an overall preference-weighted index score that varies from 0 (death) to 1.0 (perfect health).

QWB-SA—The QWB-SA (self-administered version of the QWB) was designed specifically for use in cost–utility analyses and its output is a preference-weighted index score between 0 (death) and 1.0 (perfect health) [40,41]. A variety of reliability and validity studies have been conducted using the QWB-SA [40–46]. Although designed to be self-administered, the QWB-SA was administered by an interviewer in the present study as part of a larger battery of interviewer-administered questionnaires.

The QWB-SA is composed of five parts and four subscales. Part I (symptom/problem subscale) asks about acute and chronic symptoms. Respondents answer 'yes' or 'no' to the presence of 19 distinct chronic symptoms or problems (e.g. blindness and speech problems), 25 acute physical symptoms (e.g. headache, coughing or wheezing) and 11 mental health symptoms (e.g. spells of feeling upset, downhearted and unhappy). The instructions ask respondents to think back over the last 3 days and indicate if the symptom was present yesterday, 2 days ago and/or 3 days ago. Part II uses a similar format and asks about self-care (e.g. hospitalization and whether assistance is needed with self-care). Part III (mobility subscale) asks about mobility (e.g. use of public transportation or driving). Part IV (physical activity subscale) asks about physical functioning (e.g. walking, confinement to a bed or chair). Lastly, Part V asks about performance of usual activity (e.g. work, school or

housework). Parts II and V are combined to form the social activity subscale. More information about the SF-12 and QWB-SA is available upon request from the corresponding author.

Statistical analysis

Baseline interview data are presented ($n = 574$). Analyses were conducted using SAS version 9.0. Descriptive statistics for socio-demographics, ASI scores, QWB-SA scores and SF-12 SG scores are reported in Table 1. Because few of the ASI measures were distributed normally, we computed non-parametric Spearman's correlation coefficients to describe the bivariate relationships between the ASI subscale scores and the QWB-SA and SF-12 SG scores (Table 2). Multivariate ordinary least squares (OLS) regression analysis was used to determine the partial correlations of SUD diagnoses (Table 3) and ASI scores (Table 4) with the QWB-SA and SF-12 SG scores after controlling for socio-demographic variables. The general structure of the estimating equations can be specified as follows:

$$PW_i = \beta_0 + \beta_{ASI} ASI_i + \beta_x X_i + \varepsilon_i \quad (1)$$

where PW is one of the preference-weighted health-related quality of life scores (QWB-SA or SF-12 SG), ASI is a vector of ASI composite scores, X is a vector of socio-demographic variables, i corresponds to individuals in the sample, the β s are parameters to estimate and ε is a random error term. Standardized beta coefficients are reported in Table 4 in order to assess more reliably the relative magnitude of each predictor. Given the nature of the individual-level cross-sectional data, we tested for heteroskedasticity and multicollinearity in all models. We could not reject the null hypothesis of homoskedasticity in any of the models, so no corrections were necessary in this area. However, collinearity tests revealed that the ASI employment problems and age were highly collinear. Therefore, rather than a continuous measure of age, we included a dichotomous measure equal to 1 if greater than age 32 (the mean value for the sample) and 0 if less than or equal to 32.

RESULTS

Table 1 presents mean values for baseline client socio-demographics, as well as scales associated with the ASI, QWB-SA and SF-12 SG. Results for the no life-time dependence but current problems group are shown for descriptive purposes only. Subjects not meeting criteria for life-time dependence or current problems related to substance use were significantly younger and more likely to be non-Caucasian than the life-time dependence groups. Mean ASI scores were consistent with other intervention studies reported in the literature [47]. Subjects who were not experiencing current substance abuse problems reported less severe problems associated with alcohol use, drug use and family/social interaction. There was a significant stepwise increase in ASI psychiatric problems and decrease in higher health-related quality of life scores as substance use severity increased.

Table 2 shows univariate Spearman's correlation coefficients relating ASI scores with the health-related quality of life scores. Neither the QWB-SA nor the SF-12 SG was correlated significantly with the ASI score for legal problems. Otherwise, the QWB-SA was correlated significantly with all other ASI scores and the SF-12 SG was correlated significantly with all other ASI scores except for employment problems and alcohol use. The ASI medical and psychiatric scores were the two most highly correlated with the QWB-SA and SF-12 SG. All the statistically significant ASI and health-related quality of life relationships were in the expected inverse direction, i.e. more extreme problem scores (higher ASI values) were associated with lower health-related quality of life.

Multivariate regression results are reported in Tables 3 and 4. Table 3 shows the effects of SUD diagnostic criteria on QWB-SA and SF-12 SG scores while controlling for socio-demographic variables. Using life-time dependence with current problems as the reference group, both life-time dependence without current problems and no life-time dependence were associated with statistically significant increases in QWB-SA and SF-12 SG scores. The adjusted R^2 for each model was 7.0% and 13.6%, respectively. Removing the significant demographic variables (gender and age) from the SF-12 SG equation decreased the adjusted R^2 to 10.8%.

Table 4 shows the correlations of ASI scores with QWB-SA and SF-12 SG scores, while controlling for socio-demographic variables. In the QWB-SA model, 33.4% of the variance was explained and the significant ASI scores were medical, employment, drug use and psychiatric problems. In the SF-12 SG equation, 48.1% of the variance was explained and the significant ASI scores were medical, drug use, family/social and psychiatric problems.

DISCUSSION

Analyzing cross-sectional data on 574 subjects upon entry to substance abuse treatment, we found both DSM-IV diagnostic criteria and disease-specific symptom severity as measured by the ASI to be significant predictors of QWB-SA and SF-12 SG scores. In univariate analyses, the QWB-SA was correlated significantly with six of seven ASI scores and the SF-12 SG was correlated with four or seven ASI scores. In multivariate analyses, the QWB-SA and SF-12 SG were both correlated significantly with four of seven ASI scores. The SF-12 SG diagnostic criteria and ASI multivariate regressions explained more of the variance in the than the QWB-SA regressions, although the adjusted R^2 values with the ASI scores were relatively high in both cases. Based on the multivariate results, the SF-12 SG may be more sensitive to SUD severity than the QWB-SA, but the univariate results show that the QWB-SA is correlated with a greater number of ASI subscales. Another consideration is the time to complete the measures. The mean time to complete the QWB-SA in subjects 65 years of age and older was 14 minutes [41] and the SF-12 typically takes less than 5 minutes to complete.

Tables 5 and 6 provide the context for comparing the mean QWB-SA and SF-12 SG scores from the current sample to similar health-related quality of life scores reported in other studies. These tables demonstrate that the current sample had mean health-related quality of life scores that fall in the middle range of scores from other samples with chronic physical or mental illnesses [41-43,48-54].

The following is a hypothetical range of incremental costs for a SUD intervention using Table 3 results and assuming an intervention versus usual care trial. If only half the differences between life-time dependence groups with and without current substance use problems were achieved ($0.053/2 = 0.0265$ and $0.063/2 = 0.0315$) then the mean incremental cost could be \$530–3150 and still be within the recommended \$20 000–100 000 per QALY range [55].

Challenges for substance abuse treatment programs include convincing the public that SUDs are health problems as well as social problems, and therefore the outcomes of SUD interventions can be measured in the same way as health interventions (i.e. cost per QALY) [56]. McLellan and colleagues argued that there are many similarities between chronic physical illnesses (such as type II diabetes, hypertension and asthma) and SUD in terms of genetic heritability, role of personal responsibility, treatment response and treatment adherence [56]. Our data confirm the health-related impact of SUDs using common health-related quality of life measures.

Our analyses showed that the QWB-SA and SF-12 SG were not significantly correlated with some ASI subscales in the multivariate models (e.g. alcohol, legal and family/social for QWB-SA and alcohol, legal and employment for SF-12 SG). Neither measure being correlated with alcohol use could be a function of eligibility criteria excluding subjects with only alcohol abuse or dependence. Neither measure being correlated with legal problems could be because neither measure addresses legal problems directly. The reason why the QWB-SA was correlated with ASI family/social in univariate analyses but not in multivariate analyses could be because ASI family/social was dominated by other ASI subscales (e.g. partial correlation with psychiatry and drug use subscales was $r = 0.31$ and $r = 0.23$, respectively). The reason why the SF-12 SG did not correlate with employment problems in univariate or multivariate analyses is less clear, but could be because SF-12 asks about work limitations due to physical health or emotional problems and SUD patients may not consider SUD a physical health or emotional problem. The lack of correlation with all ASI subscales is a potential weakness of using the QWB-SA or SF-12 SG for SUD CUAs. It could be argued that less than perfect correlation with disease-specific measures is a weakness inherent in all generic QALY instruments. This criticism supports the use of disease-specific QALY instruments. Of course, the strength of generic QALY measures is that they provide a common metric that can be used to directly compare the effectiveness of interventions across the physical and mental health spectrum.

Consensus regarding how and whether to conduct CUAs of SUD interventions does not currently exist. While legal problems are not considered in economic evaluations of most physical or mental interventions, it could be argued that criminal activity is associated directly with SUDs and therefore legal problems should be included in evaluations of SUDs. There is also an increasing recognition that a disproportionate number of severely mentally ill patients enter the criminal justice system, particularly homeless severely mentally ill patients with SUDs [57]. Potential approaches to economic evaluations of SUD interventions depend on the decision-maker perspective. For example, a SUD intervention economic evaluation could use a SUD-specific outcome measure or a generic QALY measure correlated most strongly with the outcome of interest in the denominator, incorporate costs not accounted for by the effectiveness measure in the numerator (i.e. avoid double counting), or use cost-benefit analysis methods. In any case, additional studies are needed to examine the construct validity of generic QALY measures relative to SUD outcomes and explore the implications of CUA and CBA evaluations of SUD interventions.

Limitations

Limitations of this study should be noted. First, subjects were recruited from a single Midwestern state rather than from a broader geographical area. The preference weights used to calculate the QWB-SA and SF-12 SG scores were derived from representative samples from the United States and United Kingdom, respectively. However, others have found no significant differences in preference weights from US and UK subjects [58]. Neither health-related quality of life measure used preference weights from a SUD sample. It is possible that the preference weights from patients with SUDs may differ systematically from those of the general population [59,60]. Nevertheless, the current recommended source of preference weights for CUAs is the general population [26]. There is one item in the QWB-SA which directly asks about substance abuse, but there are no substance abuse questions in the SF-12 and neither addresses the disutility of not using alcohol or drugs. Unequal cell sizes could inflate the differences between groups; however, when we excluded the no life-time dependence subjects from Table 3 we found minimal changes in parameter estimates or standard errors. Like most studies in this area, the reliability of the data depended on the accurate recall and reporting by subjects. However, several published studies on this topic generally conclude that self-reported data in these settings are reliable [61].

CONCLUSION

In summary, the results of this study generally support the construct validity for both the QWB-SA and SF-12 SG relative to SUD diagnostic criteria and symptom severity. These findings provide support for the use of QWB-SA and SF-12 SG in CUAs of SUD interventions. The use of a common metric (such as generic QALYs) to evaluate the effectiveness of SUD, mental health and physical health interventions is an appealing approach for comparing the relative value of health-care interventions. Within this context, CUAs of SUD interventions can compete directly for scarce health-care resources. Additional studies are needed to validate our findings and assess the responsiveness of these measures over time.

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Table 1Summary of socio-demographic, addiction severity index and health-related quality of life variables ($n = 574$)

Variable	No life-time dependence or current problems (n = 39) Mean (SD)	No life-time dependence but current problems (n = 12) Mean (SD)	Life-time dependence without current problems (n = 133) Mean (SD)	Life-time dependence with current problems (n = 390) Mean (SD)
Age ^{††**}	27.1 (8.35)	25.10 (8.24)	32.6 (9.90)	33.2 (9.60)
n (%)	n (%)	n (%)	n (%)	
Gender				
Male	28 (72)	10 (83)	81 (61)	245 (63)
Female	11 (28)	02 (17)	52 (39)	145 (37)
Race ^{**}				
Caucasian	11 (28)	03 (25)	53 (40)	231 (59)
Non-Caucasian	28 (72)	09 (75)	80 (60)	159 (41)
Marital status				
Never married/live alone	34 (87)	10 (83)	108 (81)	310 (79)
Married/live together	5 (13)	02 (17)	25 (19)	80 (21)
Education				
High school graduate or more	20 (51)	05 (42)	56 (42)	172 (44)
Less than high school graduate	19 (49)	07 (58)	77 (58)	218 (56)
ASI scales [†]				
Medical	0.193 (0.32)	0.123 (0.224)	0.176 (0.33)	0.225 (0.34)
Employment	0.776 (0.28)	0.672 (0.344)	0.790 (0.25)	0.765 (0.27)
Alcohol use ^{††***, §§***}	0.031 (0.04)	0.077 (0.087)	0.057 (0.10)	0.179 (0.25)
Drug use ^{††***, §§***}	0.027 (0.03)	0.127 (0.066)	0.030 (0.04)	0.281 (0.11)
Legal	0.223 (0.21)	0.175 (0.156)	0.216 (0.22)	0.206 (0.22)
Family/social ^{††***, §§***}	0.087 (0.16)	0.056 (0.093)	0.152 (0.20)	0.230 (0.22)
Psychiatric ^{††***, §§***}	0.077 (0.15)	0.0 (0.0)	0.194 (0.24)	0.306 (0.26)
QWB-SA [§]				
Total ^{††***, §§***}	0.706 (0.15)	0.80 (0.15)	0.630 (0.17)	0.580 (0.13)
Symptom/problem ^{††***, §§***}	0.282 (0.14)	0.20 (0.145)	0.340 (0.14)	0.390 (0.10)
Mobility	0 (0)	0.0 (0.0)	0.002 (0.01)	0.002 (0.01)
Physical activity ^{††*}	0.010 (0.02)	0.002 (0.007)	0.022 (0.04)	0.023 (0.04)
Social activity	0.002 (0.02)	0.0 (0.0)	0.006 (0.02)	0.008 (0.02)
SF-12 SG [¶]	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
Standard gamble ^{††***, §§***}	0.822 (0.11)	0.820 (0.07)	0.746 (0.14)	0.681 (0.12)
MCS-12 ^{††***, §§***}	49.33 (10.0)	48.4 (8.4)	40.10 (13.3)	31.60 (11.8)
PCS-12	52.14 (9.2)	53.9 (4.7)	51.79 (9.9)	50.76 (10.4)

* P -value < 0.05;** P -value < 0.01;

 $P\text{-value} < 0.001$.

[†] Statistical comparisons are not shown with the No life-time dependence but current problems group because of the small n .

[‡] Addiction Severity Index (ASI) scores range from 0 (no problem) to 1.0 (extreme problem).

[§] Self-administered Quality of Well-Being scale (QWB-SA) scores range from 0 (death) to 1.0 (perfect health).

[¶] SF-12 SG scores range from 0 (death) to 1.0 (perfect health).

^{††} Significant difference between No life-time dependence or current problems and life-time dependence without current problems.

^{‡‡} Significant difference between No life-time dependence or current problems and life-time dependence with current problems.

^{§§} Significant difference between Life-time dependence without current problems and ILife-time dependence with current problems.

SD: standard deviation. SF-12 SG: Short form-12 standard gamble. MCS: mental health component summary; PCS: physical health component summary.

Table 2

Spearman's correlation coefficients for ASI scales and health-related quality of life measures.

ASI scales	QWB-SA	SF-12 SG
Medical	−0.33 ***	−0.38 ***
Employment	−0.092 *	−0.055
Alcohol	−0.10 *	−0.076
Drug	−0.22 ***	−0.33 ***
Legal	0.007	0.03
Family/social	−0.25 ***	−0.35 ***
Psychiatric	−0.53 ***	−0.61 ***

Lower Addiction Severity Index (ASI) scores correspond to fewer problems in the respective domain. Higher self-administered Quality of Well-Being scale (QWB-SA) and Short form-12 standard gamble (SF-12 SG) scores correspond to better health-related quality of life.

* P -value < 0.05;

*** P -value < 0.001.

Table 3

Multiple linear regression results describing the relation of substance use disorder (SUD) criteria on QWB-SA and SF-12 standard gamble.

Explanatory variables	QWB-SA	SF-12 SG
Age	−0.0007	−0.002 **
Gender (1 = male)	−0.016	−0.04 ***
Race (1 = white)	−0.00006	0.014
Marital (1 = married)	0.023	0.010
Education (1 = HS grad or more)	0.001	0.0015
No life-time dependence or current substance problems	0.124 ***	0.125 ***
Life-time dependence without current substance problems	0.053 ***	0.063 ***
Constant	0.603 ***	0.741 ***
<i>R</i> -square	0.070	0.136

**
 P -value < 0.01,

 P -value < 0.001.

QWB-SA: self-administered Quality of Well-Being scale. SF-12 SG: Short form-12 standard gamble.

Table 4

Multiple linear regression results describing the relation of ASI scores on QWB-SA and SF-12 standard gamble[†].

Explanatory variables	QWB-SA	SF-12 SG
Age category (1 = age 32)	0.02	−0.04
Gender (1 = male)	0.00005	0.06 [*]
Race (1 = white)	0.002	−0.03
Marital (1 = married/living together)	0.05	0.02
Education (1 = high school graduate or more)	−0.03	−0.02
ASI medical scale	−0.22 ^{***}	−0.26 ^{***}
ASI employment scale	−0.096 ^{**}	−0.06
ASI alcohol use scale	0.01	0.03
ASI drug use scale	−0.11 ^{**}	−0.16 ^{***}
ASI legal status scale	0.026	0.01
ASI family/social scale	−0.05	−0.125 ^{***}
ASI psychiatric scale	−0.42 ^{***}	−0.44 ^{***}
Adjusted R^2	0.334	0.481

^{*} P -value < 0.05,

^{**} P -value < 0.01,

^{***} P -value < 0.001.

[†] Standardized beta coefficient is reported.

ASI: Addiction Severity Index; QWB-SA: self-administered Quality of Well-Being scale; SF-12 SG: short-form-12 standard gamble.

Table 5

Quality of well-being-self administered scores by subject group.

Subject group	Mean QWB-SA *	Standard deviation	Reference
No life-time drug dependence or current problems	0.706	0.150	Current paper
General population: elderly	0.704	0.099	[41]
Colon cancer	0.660	0.140	[48]
Primary care	0.651	0.134	[49]
Life-time drug dependence without current problems	0.630	0.170	Current paper
Prostate cancer	0.610	0.150	[48]
Rectal cancer	0.610	0.160	[48]
Cataract pre-op	0.600	0.130	[50]
Life-time drug dependence with current problems	0.580	0.130	Current paper
Fibromyalgia	0.559	0.074	[51]
Arthritis	0.516	0.130	[49]
Migraine with headache	0.492	0.157	[42]
Depression (out-patient)	0.479	0.115	[43]
Depression (in-patient)	0.383	0.118	[43]

* Quality of well-being scale-self administered. QWB-SA: self-administered Quality of Well-Being scale.

Table 6

Medical outcomes study short form-12 standard gamble scores by group.

Subject group	Mean SF-12-SG*	Standard deviation	Reference
No life-time drug dependence or current problems	0.822	0.110	Current paper
General male population: ages 60–69	0.803	NA	[52]
General male population: ages 70–79	0.770	NA	[52]
Life-time drug dependence without current problems	0.746	0.140	Current paper
Asthma	0.724	0.116	[53]
General female population: ages 80–89	0.700	NA	[52]
Life-time drug dependence with current problems	0.681	0.120	Current paper
Irritable bowel syndrome	0.666	0.146	[54]
Stroke	0.609	0.099	[53]
Chronic obstructive pulmonary disease	0.572	0.112	[54]
Osteoarthritis	0.521	0.114	[54]

NA = not available,

* Short form-12 standard gamble.