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Quality of well-being in late-life psychosis

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Abstract

Research in mental health has generally used evaluation and outcome measures different from those applied in other medical specialties. We evaluated the utility of a general health measure, the Quality of Well-Being (QWB) scale, in older patients with psychosis. The QWB and standardized rating scales for assessing psychopathology, cognitive impairment, physical comorbidity, and neuroleptic-induced tardive dyskinesia were administered to 85 patients with functional psychoses (mostly schizophrenia or schizoaffective disorder) and 39 normal comparison subjects over age 45. The patients were more impaired than normal comparison subjects on the QWB and other rating scales. The QWB score was affected more by severity of positive symptoms than by any non-psychopathology-related variables. The patients' QWB scores were similar to those of previously studied ambulatory patients with AIDS. Use of the QWB scale may allow direct comparisons of the impact of different psychiatric and physical disorders on the quality of life.

Keywords: Quality of life; Health services research; Schizophrenia; Outcomes research; Positive symptoms; Dyskinesia

1. Introduction

The World Health Organization (1948) has defined health as a complete state of physical, mental, and social well-being, and not merely the absence of disease. This statement has formed the basis for most contemporary outcomes research. The most common outcome assessment methods use separate measures for physical, mental, and social functioning (Kaplan and Anderson, 1990). In a factor analysis of a number of outcome measures, Ware (1993) demonstrated that most items from these scales loaded on one of two factors: physical or mental. As a result, physical and mental health outcomes are typically regarded as separate constructs that are not directly comparable. This may have consequences for health-care economic policy. In the present era of limited health resources, all health-care providers compete for the same resources. Mental health services often receive low priority when funds are allocated, in part because they have not been

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shown to have an impact on traditional public health measures of life expectancy or infant mortality. Although most physical health-care service providers and pharmaceutical product promoters now use quality-of-life measures to document their effectiveness, such outcome measures have not been widely applied in mental health research.

Kaplan (1990, 1993c) has argued that a common measurement unit should be applied to assess mental and physical health. In fact, comparisons between any competitors in health care require that outcomes be expressed using some common denominator. Not all health-care interventions are equally efficient in returning benefits for the expended dollar. In cost-utility analysis, the benefits of medical care, behavioral interventions, or preventive programs are expressed by 'well years' produced. These outcomes have also been described as quality-adjusted life years (QALYs) (Kaplan, 1993c).

QALYs integrate mortality and morbidity to express health status in terms of equivalents of 'well years' of life. For example, if a patient with schizophrenia who would have been expected to live to age 75 were to commit suicide at age 40, it might be concluded that the disease was associated with 35 lost life years. If 100 such subjects, who had a life expectancy of 75 years, died at age 40, we might conclude that 3500 (100 subjects × 35 years) life years had been lost. Yet, death is not the only outcome of concern in psychotic illness. Schizophrenia tends to leave patients variably disabled over long periods of time. Although the patients are still alive, their quality of life is diminished. The QALYs take into consideration the quality-of-life consequences of specific illnesses. For example, a disease that reduces quality of life by 50% will take away 0.5 QALY over the course of each year; in 100 such persons, it will take away 50 QALYs (100 × 0.5) over 100 subject years. A medical (e.g., neuroleptic) treatment that improves quality of life by 0.2 (20%) for each of 100 individuals will increase the equivalent of 20 QALYs for 100 subject years if the benefit is maintained over a 1-year period. This computational system has the advantage of using common QALY units to consider both benefits (e.g., symptomatic improvement) and risks (e.g., tardive dyskinesia) of treatments.

The Quality of Well-Being (QWB) scale provides a general health measure (QWB score) that is capable of quantifying functional consequences of an illness as well as its treatment. The QWB has been used in a wide variety of population studies (Anderson et al., 1989; Erickson et al., 1989). In addition, the methods have been used in clinical trials and studies to evaluate therapeutic interventions in a wide range of medical and surgical conditions. These include chronic obstructive pulmonary disease (Kaplan, 1984), AIDS (Kaplan et al., 1995), cystic fibrosis (Orenstein et al., 1990), diabetes mellitus (Kaplan et al., 1987), atrial fibrillation (Ganiats et al., 1992), lung transplantation (Squier et al., 1995), arthritis (Bombardier et al., 1986), cancer (Kaplan, 1993a), and a wide variety of other conditions (Kaplan, 1993c). The QWB can be used to evaluate the relative importance of both therapeutic and adverse effects of a treatment so that a net assessment of the value of that treatment can be calculated by subtracting the consequences of side effects from benefits through estimates of QALYs (Kaplan and Anderson, 1990). This argument has provided some of the background justification for including mental health services in the plan to prioritize services in the reform of the original Oregon Medicaid system. Under the Oregon plan, all services are prioritized according to their expected health benefit (Kaplan, 1993b). In the original Oregon proposal, the QWB scale was used to estimate the effectiveness of various services (Kaplan and Anderson, 1990). The validity of the QWB as an outcome measure for patients with mental health problems has, however, not been previously evaluated.

Quality of life is a multidimensional concept that includes physical functioning, social functioning, and emotional health, and has been extended to include neuropsychological functioning, productivity, and intimacy (Shumaker and Czajkowski, 1993). Measures such as the QWB have been designed to assess quality of life in a broad range of populations. Other measures that were designed for broad population use, such as the Medical Outcomes Study (MOS) health survey, yield profiles of health-related functioning but lack a single integrated score that can be readily used for comparisons across medical or psychiatric

conditions (Hays et al., 1993). Some measures of quality of life have been designed for specific patient populations (e.g., the Quality of Life Interview for Psychiatric Patients), and range from single indices (e.g., Karnofsky Performance Status and the Functional Living Index (Ganz et al., 1988)) to batteries of measures that assess multiple dimensions of health functioning (Shumaker et al., 1990). Perhaps the best known measure of quality of life in psychiatry was developed by Lehman et al. (1993). Their interview provides a broad-based assessment of recent and current life experiences in a variety of life areas and has been widely used in psychiatric populations (e.g., Lehman et al., 1986, 1991; Goldman et al., 1994; Gater et al., 1995). A discussion of quality-of-life measures in relation to psychopharmacology research may be found in Awad (1992) and Meltzer et al. (1993).

The use of disparate approaches to the measurement of health status may result in different degrees of morbidity for a single illness. A series of analyses using data from the MOS has shown that depression has a significant impact on functioning and quality of life. For example, Wells and Burman (1991) found that depression was associated with as much limitation on general health measures as were several major chronic medical diseases. Stewart et al. (1993) reported that patients of mental health specialists had worse mental health and more limitations in social activities than did patients of medical clinicians. In contrast, patients of nonpsychiatric physicians had worse physical functioning, more pain, more physical/psychophysiologic symptoms, and worse health perceptions than those seeing mental health practitioners; however, patients of both types of practitioners had significant limitations in general functioning. Another study by the same group showed that depressed patients had the same prevalence of common chronic medical conditions as patients seen by general practitioners (Wells et al., 1991). The measures used in the MOS studies are general so that the metric allows the comparison of the impact of mental health and general medical problems. The MOS measures do not, however, produce a single unit that can be expressed as a QALY. These metrics are required to perform economic evaluations such as cost-utility analysis. To our knowledge, no studies have used QALY metrics to evaluate mental health outcomes.

Psychoses are among the most serious psychiatric disorders. Schizophrenia, the prototypical chronic psychosis, is probably the most expensive mental disorder in direct treatment costs, loss of productivity, and expenditures for public assistance (Rice and Miller, 1996). Currently, the most effective treatment for most psychoses is symptomatic and involves the use of antipsychotic or neuroleptic drugs. While these drugs have reduced the morbidity associated with schizophrenia and other psychoses, they have also caused serious iatrogenic problems including persistent tardive dyskinesia (Jeste and Caligiuri, 1993).

With greater longevity, there will be a growing number of older patients with schizophrenia (Jeste, 1993) as well as a greater number of patients with other types of psychoses. Neuroleptics are frequently prescribed for elderly psychotic patients. At the same time, the risk of tardive dyskinesia increases with aging (Jeste et al., 1995). One goal of our study was to examine cross-sectionally the relationship of the QWB (a general health measure) to measures of psychopathology as well as global cognitive impairment, physical comorbidity, and neuroleptic-induced movement disorder, in a sample of middle-aged and elderly patients with functional psychoses and normal comparison subjects. We hypothesized that lower QWB scores would be associated with greater severity of psychiatric and physical morbidity. We also hypothesized that psychiatric morbidity associated with psychosis would account for a significant variance in the QWB after level of physical and cognitive impairment had been taken into account. Another goal of this study was to contrast the QWB scores for our sample of patients with previously published values for patients with physical illnesses such as AIDS.

2. Methods

2.1. Sample selection

The sample comprised 85 outpatients with functional psychoses and 39 normal comparison sub-

jects over age 45 who consented to participate in a study at the Clinical Research Center for Late-Life Psychosis at the University of California, San Diego. All the subjects had to have physical and psychiatric ability to undergo extensive research evaluation. Subjects with current substance abuse or dependence or 'organic' mental disorders that would meet *DSM-III-R* (American Psychiatric Association, 1987) diagnostic criteria were excluded. Selection criteria for normal comparison subjects were similar to those for patients, except for requiring the absence of a history or current diagnosis of any major psychiatric or neurological disorder. The patients were recruited from the Veterans Affairs Medical Center in San Diego, the University of California San Diego Medical Center, and the San Diego community. The comparison subjects were recruited from among volunteers at the Veterans Affairs Medical Center, San Diego, and through local advertisements in San Diego County.

Psychiatric diagnoses were based on the Patient version of the Structured Clinical Interview for *DSM-III-R* (SCID-P; Spitzer et al., 1990). Research diagnoses were arrived at in psychiatric staffing meetings that included several board-certified specialists in geriatric psychiatry and other clinicians. The majority of the patients had a diagnosis of schizophrenia, and the mean age at first psychiatric hospitalization was approximately 31 years. Significantly more of the patients were male ($\chi^2 = 16.35$, $df = 1$, $P < 0.001$), single or divorced ($\chi^2 = 19.76$, $df = 5$, $P < 0.01$), and younger ($t = 5.06$, $df = 122$, $P < 0.01$) than normal comparison subjects. (See Table 1 for sample characteristics.) All the subjects were psychiatrically, physically, and pharmacologically in a relatively stable state; that is, they had had no major changes for at least several weeks before the assessment.

Table 1
Demographics

	Normal comparison subjects ($n = 39$)	Patients with psychosis ($n = 85$)
Age (years)*, mean (SD)	67.0 (10.9)	57.6 (9.6)
Education (years), mean (SD)	13.9 (2.4)	12.9 (3.1)
Age at first psychiatric hospitalization (years), mean (SD)	— —	31.2 (18.6)
*Gender**		
Female, *n* (%)	20 (51.3)	16 (18.8)
Male, *n* (%)	19 (48.7)	69 (81.2)
Psychiatric diagnosis		
Schizophrenia, *n* (%)	— —	55 (64.7)
Schizoaffective disorder, *n* (%)	— —	9 (10.6)
Mood disorder with psychotic features, *n* (%)	— —	15 (17.6)
Other psychotic disorder, *n* (%)	— —	6 (7.1)
No diagnosis, *n* (%)	39 (100.0)	— —
Marital status		
Single, *n* (%)	2 (5.1)	27 (31.8)
Cohabitating, *n* (%)	2 (5.1)	2 (2.4)
Separated/divorced, *n* (%)	9 (23.1)	24 (28.2)
Widowed, *n* (%)	4 (10.3)	11 (12.9)
Married, *n* (%)	22 (56.4)	21 (24.7)
Ethnicity		
Caucasian, *n* (%)	36 (92.3)	69 (81.2)
African-American, *n* (%)	2 (5.1)	9 (10.6)
Hispanic, *n* (%)	0 (0.0)	5 (5.9)
Asian-American, *n* (%)	1 (2.6)	2 (2.4)
Receiving neuroleptics at baseline		
Yes, *n* (%)	0 (0.0)	74 (87.1)
No, *n* (%)	39 (100.00)	11 (12.9)

*$P < 0.001$ (two-tailed t test or χ^2 test).

2.2. Primary measure: Quality of Well-being (QWB) scale

The use of the QWB scale involves three steps: (1) The scale classifies subjects according to three subscales of observable functioning: Mobility, Physical activity, and Social activity, and one subscale of subjective symptoms. Mobility refers to the performance of activities relevant to getting around the community (e.g., did a person travel, use public transportation, or drive a car?). Physical activity considers whether a person walked without physical problems (e.g., did the subject walk without limitations, or was the subject in a

bed or chair during most of the assessment period?). Social activity evaluates role performance (e.g., did the person perform major social activities without help?). (For detailed descriptions of these dimensions, see Kaplan and Anderson, 1990.) In addition to these three types of functional limitations that might be verified by an observer, there are also subjective complaints (symptoms and problems) that constitute the fourth component of the QWB. The complaints range from relatively minor concerns (e.g., following a restricted diet) to serious events (e.g., loss of

Table 2
Quality of well-being/general health policy model: Elements and calculating formulas (function scales, with step definitions and calculating weights)

Step No.	*Step definition*	*Weight*
Mobility scale (MOB)		
5	No limitations for health reasons	−0.000
4	Did not drive a car, health related; did not ride in a car as usual for age (< 15 years), health related, *and/or* did not use public transportation, health related; *or* had or would have used more help than usual for age to use public transportation, health related	−0.062
2	In hospital, health related	−0.090
Physical activity scale (PAC)		
4	No limitations for health reasons	−0.000
3	In wheelchair, moved or controlled movement of wheelchair without help from someone else; *or* had trouble or did not try to lift, stoop, bend over, or use stairs or inclines, health related; *and/or* limped, used a cane, crutches, or walker, health related; *and/or* had any other physical limitation in walking, or did not try to walk as far as or as fast as others the same age are able, health related	−0.060
1	In wheelchair, did not move or control the movement of wheelchair without help from someone else, *or* in bed, chair, or couch for most or all of the day, health related	−0.077
Social activity scale (SAC)		
5	No limitations for health reasons	−0.000
4	Limited in other (e.g., recreational) role activity, health related	−0.061
3	Limited in major (primary) role activity, health related	−0.061
2	Performed no major role activity, health related, but did perform self-care activities	−0.061
1	Performed no major role activity, health related, *and* did not perform or had more help than usual in performance of one or more self-care activities, health related	−0.106

Calculating formulas

Formula 1. Point-in-time well-being score for an individual (W):

$$W = 1 + (\text{CPXwt}) + (\text{MOBwt}) + (\text{PACwt}) + (\text{SACwt})$$

where 'wt' is the preference-weighted measure for each factor and CPX is Symptom/Problem complex. For example, the W score for a person with the following description profile may be calculated for 1 day as:

CPX — 11	Cough, wheezing or shortness of breath, with or without fever, chills, or aching all over	−0.257
MOB — 5	No limitations	−0.000
PAC — 1	In bed, chair, or couch for most or all of the day, health related	−0.077
SAC — 2	Performed no major role activity, health related, but did perform self-care	−0.061

$$W = 1 \_ (-0.257) + (-0.000) + (-0.077) + (-0.61) = 0.605$$

Formula 2. Well years (WY) as an output measure:

$$WY = [\text{No. of persons} \times (\text{CPXwt} + \text{MOBwt} + \text{PACwt} + \text{SACwt}) \times \text{Time}]$$

consciousness). (2) Once observable-behavioral levels of functioning have been classified, a second step is required to place each individual on the 0.0–1.0 scale of wellness. To accomplish this, the observable health states are weighted by 'quality' ratings for the 'desirability' of these conditions. Human value studies have been conducted to place the observable states onto a preference continuum with an anchor of 0.0 for death and 1.0 for completely well. A random sample of citizens from a metropolitan community evaluated the 'desirability' of over 400 case descriptions. On the basis of these 'desirability' ratings, a preference structure that assigned the weights to each combination of an observable state and a symptom/problem was developed. Cross-validation studies have shown that the model can be used to assign weights to other states of functioning with a high degree of accuracy. Systematic studies show that differences in the 'desirability' ratings between patients and community members are rarely statistically significant. Tables 2 and 3 present the weights. Other work has demonstrated that these weights are highly stable over a 1-year period and that they are

Table 3
Quality of well-being/general health policy model: Symptom/problem complexes (CPX) with calculating weights

CPX No.	CPX description	Weights
1	Death (not on respondent's card)	−0.727
2	Loss of consciousness such as seizure (fits), fainting, or coma (out cold or knocked out)	−0.407
3	Burn over large areas of face, body, arms, or legs	−0.37
4	Pain, bleeding, itching, or discharge (drainage) from sexual organs — does not include normal menstrual (monthly) bleeding	−0.349
5	Trouble learning, remembering, or thinking clearly	−0.340
6	Any combination of one or more hands, feet, arms, or legs either missing, deformed (crooked), paralyzed (unable to move), or broken — includes wearing artificial limbs or braces	−0.333 −0.299
7	Pain, stiffness, weakness, numbness, or other discomfort in chest, stomach (including hernia or rupture), side, neck, back, hips, or any joints or hands, feet, arms, or legs	
8	Pain, burning, bleeding, itching, or other difficulty with rectum, bowel movements, or urination (passing water)	−0.292
9	Sick or upset stomach, vomiting or loose bowel movement, with or without chills, or aching all over	−0.290
10	General tiredness, weakness, or weight loss	−0.259
11	Cough, wheezing, or shortness of breath, *with* or *without* fever, chills, or aching all over	−0.257
12	Spells of feeling upset, being depressed, or crying	−0.257
13	Headache, or dizziness, or ringing in ears, or spells of feeling hot, nervous, or shaky	−0.244
14	Burning or itching rash on large areas of face, body, arms, or legs	−0.240
15	Trouble talking, such as lisp, stuttering, hoarseness, or being unable to speak	−0.237
16	Pain or discomfort in one or both eyes (such as burning or itching) or any trouble seeing after correction	−0.230
17	Overweight for age and height or skin defect of face, body, arms, or legs, such as scars, pimples, warts, bruises, or changes in color	−0.188
18	Pain in ear, tooth, jaw, throat, lips, or tongue; several missing or crooked permanent teeth — includes wearing bridges or false teeth; stuffy, runny nose; or any trouble hearing — includes wearing a hearing aid	−0.170
19	Taking medication or staying on a prescribed diet for health reasons	−0.144
20	Wore eyeglasses or contact lenses	−0.101
21	Breathing smog or unpleasant air	−0.101
22	No symptoms or problem (not on respondent's card)	−0.000
23	Standard symptom/problem	−0.257
X24	Trouble sleeping	−0.257
X25	Intoxication	−0.257
X26	Problems with sexual interest or performance	−0.257
X27	Excessive worry or anxiety	−0.257

consistent across diverse groups of raters (Kaplan and Anderson, 1990). (3) Finally, it is necessary to consider the duration for which the individuals remain in various health states. For example, 1 year in a state that has been assigned the weight of 0.5 is equivalent to 0.5 of a QALY.

The well-life expectancy, usually expressed as QALYs, is the current life expectancy adjusted for diminished quality of life associated with dysfunctional states and the durations of stay in each state. It is possible to consider mortality, morbidity, and the preference weights for the various observable states of function. The model quantifies the health activity or treatment program in terms of the QALYs that it produces or saves. A QALY is defined as the equivalent of a completely well year of life, or a year of life free of any symptoms, problems, or health-related disabilities.

The model for point-in-time QWB is: QWB = 1 – (observed morbidity × morbidity weight) – (observed physical activity × physical activity weight) – (observed social activity × social activity weight) – (observed symptom/problem × symptom/problem weight).

Reliability and validity studies show that the QWB has internal consistency, stable preference weights, and correlates with a wide variety of medical and psychosocial variables (Kaplan et al., 1989). In the present study, the QWB interview of our patients required approximately 20 min per subject. The QWB was administered by raters who were trained in a 2-day workshop conducted by Dr. Kaplan's laboratory. Raters received training in the background, administration, and coding of the QWB. Agreement between raters (intraclass correlation coefficient [ICC]) was 0.95. The raters were unaware of psychiatric ratings that were performed during the same visit by different clinical personnel.

2.3. Other measures

The Scale for the Assessment of Positive Symptoms (SAPS; Andreasen and Olsen, 1982) and the Scale for the Assessment of Negative Symptoms (SANS; Andreasen, 1982) were used to assess the degree of psychotic symptoms. The 17-item Hamilton Rating Scale for Depression (HRSD; Hamilton, 1960) was given to assess depressive symptoms experienced over the 2-week period that preceded the subject's interview. We also used the Global Severity Index (GSI) of psychological disturbance, derived from the Brief Symptom Inventory (BSI). Both the criterion validity and the construct validity of the BSI have been examined in psychiatric outpatients, nonpsychiatric outpatients, and normal comparison subjects (Derogatis et al., 1974; Depue et al., 1975). The GSI uses a single score to represent the current degree of psychological disturbance (Depue et al., 1975).

Additional measures included the Mini-Mental State Examination (MMSE; Folstein et al., 1975) for degree of global cognitive impairment, the Cumulative Illness Rating Scale in Geriatrics (CIRS-G; Miller et al., 1992) for physical comorbidity, and the Abnormal Involuntary Movement Scale (AIMS; National Institute of Mental Health, 1976) to examine the severity of dyskinesia.

All the rating scales used had a high (ICC > 0.76) degree of interrater reliability.

2.4. Statistical analysis

Statistical procedures were performed with SPSS/PC+ Version 6.0 (Norusis, 1993). Data were examined for homogeneity of variance. In determining the overall difference on the QWB and other scales between normal comparison subjects and patients, we used t tests for independent means. To determine the strength of the relationship between the QWB and the psychiatric rating scales among patients, we used Pearson product-moment correlations (r). In addition, the sensitivity of the QWB in relation to severity of psychopathology was examined by splitting our patient population into tertiles (yielding approximately 28 patients in each group) for each rating scale. One-way analyses of variance, which included tests for linearity, were then conducted with the QWB as the independent variable. Specifically, tests for linearity were used to evaluate whether mean scores on the QWB systematically decreased as severity of psychopathology increased (as determined by tertile groups). Finally, to determine which of the rating scale variables predicted QWB scores after controlling for physical symptoms, we conducted a hierarchical regression analysis.

Table 4
Means and standard deviations for scores on the QWB and psychiatric rating scales in 39 normal comparison subjects and 85 patients with psychosis

	Normal subjects		Patients	
	Mean	SD	Mean	SD
QWB	0.71	0.09	0.58*	0.11
SAPS	0.63	1.04	4.50*	3.66
SANS	1.49	2.20	7.30*	4.81
HRSD	2.83	3.04	10.45*	6.87
GSI	0.14	0.14	0.81*	0.63
MMSE	28.68	1.13	27.37*	2.46
CIRS-G	2.32	2.11	5.26*	3.72
AIMS	2.00	2.24	5.68*	3.76

Note. QWB, Quality of Well-Being scale. SAPS, Scale for the Assessment of Positive Symptoms. SANS, Scale for the Assessment of Negative Symptoms. HRSD, Hamilton Rating Scale for Depression. GSI, Global Severity Index derived from the Brief Symptom Inventory. MMSE, Mini-Mental State Examination. CIRS-G, Cumulative Illness Rating Scale for Geriatrics. AIMS, Abnormal Involuntary Movement Scale. *$P < 0.001$ (two-tailed t test).

All the statistical tests were two-tailed. To reduce the probability of a Type I error, we used $P < 0.001$ as the level of significance for all the univariate analyses.

3. Results

Among patients with psychosis, there was no significant difference in the QWB scores between those who were diagnosed with schizophrenia (mean = 0.58) versus those with other diagnoses (mean = 0.59) ($t = -0.19$, $df = 86$, $P > 0.05$). To increase statistical power, we grouped together all these patients for further analyses. Compared with the normal comparison subjects, the patients had significantly lower QWB scores and significantly higher scores on all the psychiatric and other rating scales. Table 4 displays means, standard deviations, and significance test results for the

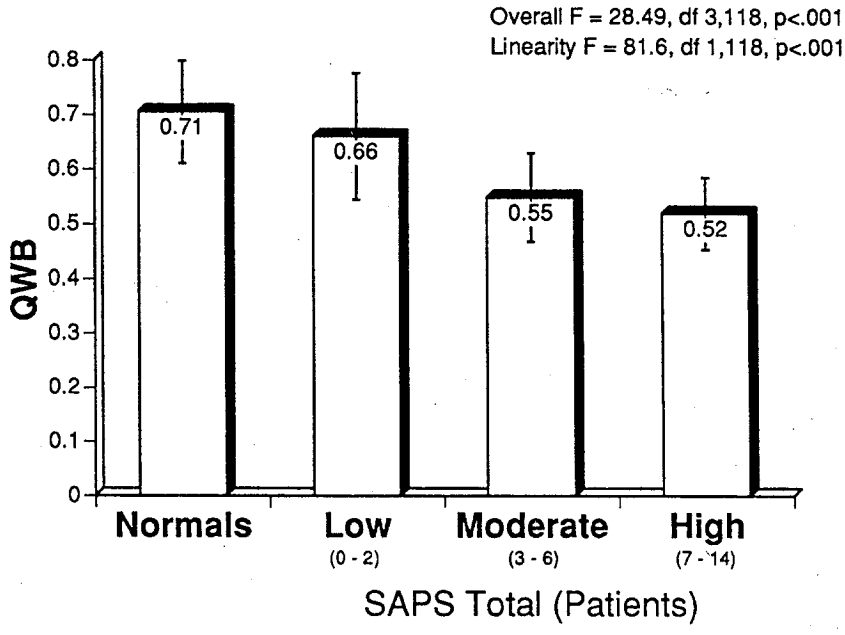

Fig. 1. Mean (with standard deviation bars) scores on the Quality of Well-Being (QWB) scale for the normal comparison group, and three groups of outpatients with psychosis who had low, moderate, and high scores, respectively, on the Scale for the Assessment of Positive Symptoms (SAPS).

QWB and psychiatric variables for the normal comparison subjects and the patients.

Among the patients, QWB scores correlated significantly ($P < 0.001$) with scores on the SAPS ($r = -0.48$), the SANS ($r = -0.36$), the HRSD ($r = -0.44$), and the GSI ($r = -0.57$). The magnitude and direction of these correlations indicated that patients with higher scores on psychopathology had lower QWB scores. The QWB scores did not correlate significantly with age of onset and duration of illness, or with MMSE, CIRS-G, or AIMS scores.

A comparison of the normal subjects and three patient groups defined by low (0–4), moderate (5–10), and high (>10) scores on the SAPS revealed that the groups differed significantly from one another on the QWB (Group: $F = 28.49$, $df = 3,118$, $P < 0.001$) (see Fig. 1). Also, there was a significant linear relationship between the QWB and the SAPS scores; patients with higher SAPS scores had lower QWB scores (Linearity: $F = 81.60$, $df = 1,118$, $P < 0.001$) (see Fig. 1). The same pattern of results was found for the SANS, HRSD, GSI, and AIMS scores. Thus, these analyses indicated that patients with more severe psychopathology or more severe tardive dyskinesia experienced lower quality of life as compared with patients with fewer symptoms and normal subjects.

Next, we examined the individual components of the QWB to determine if specific areas of functioning were sensitive to psychiatric status. Fig. 2 displays means for each QWB component for normal subjects, and patients with low, moderate, and high SAPS scores. The SAPS group differences, and tests of linearity, were significant for all the components of the QWB indicating that patients with higher SAPS scores had increased scores on

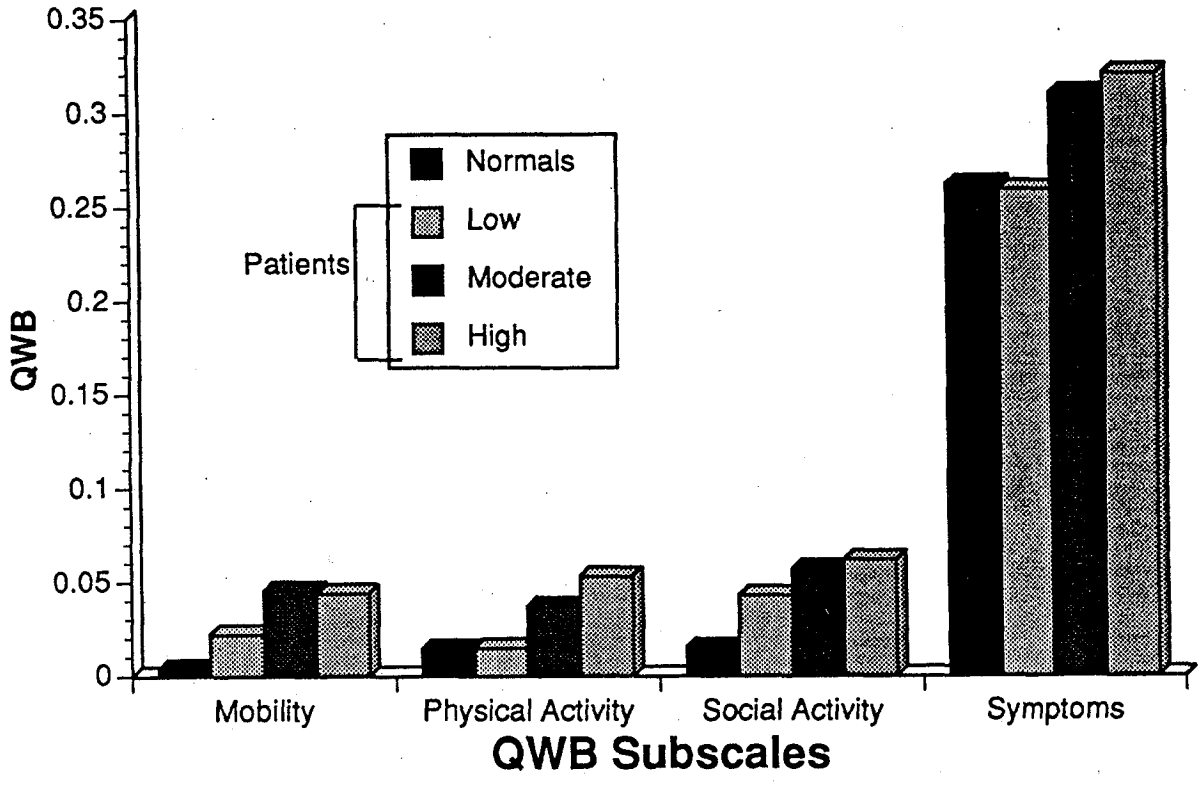

Fig. 2. Mean scores on the four subscales of the Quality of Well-Being (QWB) scale (Mobility, Physical activity, Social activity, and Symptoms) for the normal comparison group, and three groups of outpatients with psychosis who had low, moderate and high scores, respectively, on the Scale for the Assessment of Positive Symptoms (SAPS). All Group and Linearity tests were statistically significant (see the Results section for details).

all the components of the QWB. (Note that component elements of the QWB are subtracted from a maximum score of 1.0 to obtain a summary score; thus, higher values on the components are related to a decreased quality of life.) The individual values were: mobility (Group: $F = 15.00$, $df = 3,119$, $P < 0.001$; Linearity: $F = 40.42$, $df = 1,119$, $P < 0.001$); physical activity (Group: $F = 12.01$, $df = 3,119$, $P < 0.001$; Linearity: $F = 32.46$, $df = 1,119$, $P < 0.001$); social activity (Group: $F = 15.55$, $df = 3,118$, $P < 0.001$; Linearity: $F = 42.48$, $df = 1,118$, $P < 0.001$), and symptom or complaint/problem complexes (CPX) weights (Group: $F = 9.26$, $df = 3,119$, $P < 0.001$; Linearity: $F = 23.28$, $df = 1,119$, $P < 0.001$). The same pattern of results was found with the SANS, HRSD, and GSI scores. Thus, all the components of the QWB were associated with greater impairment among patients with greater psychopathology compared with those with lower levels of psychopathology. It is of interest that the pattern was somewhat different for the AIMS scores. Three patient groups (with low, moderate, and high AIMS scores) and the normal comparison group differed on Mobility (Group: $F = 5.95$, $df = 3,91$, $P < 0.001$) and Social activity (Group: $F = 13.38$, $df = 3,91$, $P < 0.0001$), but not Physical activity (Group: $F = 4.81$, $df = 3,91$, $P < 0.01$) and Symptom weight (Group: $F = 2.62$, $df = 3,91$, $P = 0.06$) components of the QWB.

Finally, to determine the relative importance of the various indicators assessed in this sample, we conducted a multiple regression analysis to predict QWB scores. To guard against multicollinearity concerns, we first examined the correlation coefficients among the different measures of psychopathology. These correlations ranged from −0.02 to 0.48, suggesting that multicollinearity was not a significant problem in this analysis. Using a hierarchical procedure, we entered three blocks of predictor variables: the first block included age and gender (control variables); the second block included AIMS scores (to control for tardive dyskinesia); and the third block of variables included the three specific psychopathology scores (SAPS, SANS, and HRSD). The first and second blocks of variables were not significant; however, the third block of psychopathology variables was highly significant ($F = 4.88$, $df = 6,54$, $P = 0.0005$). The only significant predictor within the third block of variables was the SAPS score ($\beta = -0.38$, $P = 0.009$).

4. Discussion

Our data suggested that psychosis had a substantial impact on the health-related quality of life of older patients with psychosis. Compared with normal subjects (with a mean QWB score of 0.71), patients appeared to lose 0.19 well years for every year with severe positive symptoms (patients with the highest SAPS scores had a mean QWB score of 0.52) (Fig. 1). The QWB score did not correlate with severity of global cognitive impairment or physical comorbidity. Regression analysis revealed that the best predictor of the QWB scores for the patient population was the SAPS score. This relationship still obtained when age, gender, and tardive dyskinesia were taken into account.

Mental health problems have a considerable impact on the society, comparable to that of physical health problems. The QWB evaluates symptoms and observable dysfunction. For example, a person with a cough experiences a symptom and this is reflected in a minor deviation from a perfect QWB score of 1.0. If the cough prevents the person from leaving home, a greater deviation from wellness is recorded. A cough that results in hospitalization leads to an even lower QWB score. Our study supports the notion that the same scoring system can also be applied to mental health problems. We have demonstrated that the QWB is sensitive to different levels of the severity of psychotic symptoms. The patients in the present study were all living in the community at the time of evaluation. Psychosis that required hospitalization would be expected to be associated with an even lower QWB score.

Treatments for coughs and chronic lung diseases have been shown to produce significant health benefits in QWB units, and quality-of-life outcomes have been used in cost-utility comparisons to justify reimbursement of providers (Toevs et al., 1994). If the QWB is a reliable and valid health measure in psychotic illness, then effective treatments for patients with psychosis should

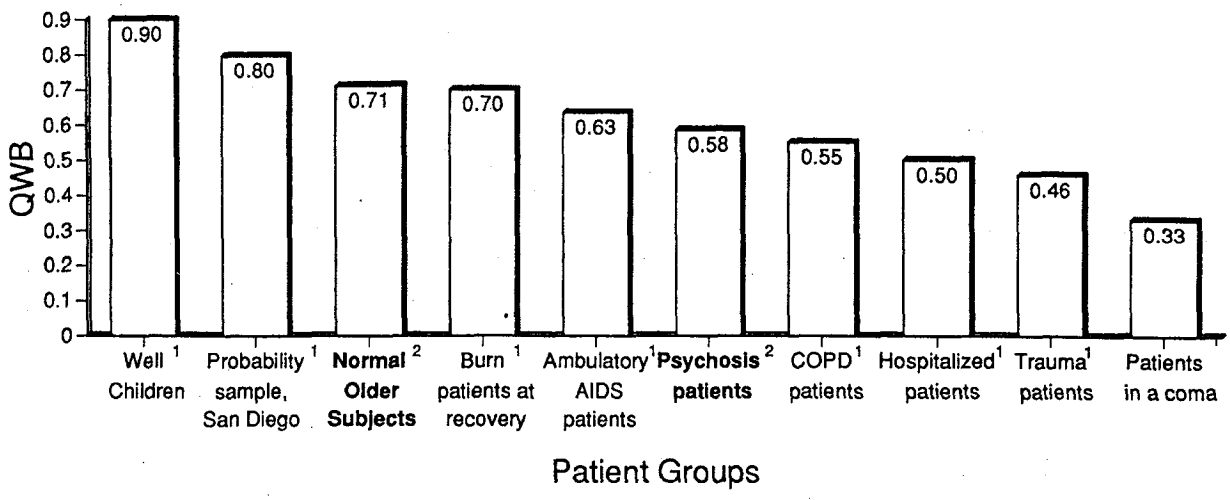

Fig. 3. Mean scores on the Quality of Well-Being (QWB) scale for normal comparison subjects and outpatients with psychosis in the present study, along with those for several other groups of subjects studied previously (Kaplan and Anderson, 1990). COPD, chronic obstructive pulmonary disease. [1]From Kaplan. [2]From the present study.

result in the production of well years that can be used in cost-utility comparisons. Such comparisons may be valuable in the health-care resource allocation debate.

Our finding that the SAPS scores were significantly related to the quality of life of the patients over and above the side effects of the drug treatment has implications for decisions regarding the risk:benefit ratio of neuroleptic therapy. Our study indicates that the greatest decrease in the QWB score stems from positive psychotic symptoms rather than from tardive dyskinesia. The results suggest that the benefits of neuroleptic treatment in controlling positive symptoms may frequently outweigh the negative consequences of tardive dyskinesia.

It is important to consider the clinical importance of the QWB values identified in this study. In Fig. 3, we provide a comparison of our QWB data with the QWB data gathered from other patient populations. As can be seen, the mean QWB scores of the group of older outpatients with psychosis were similar to (or slightly lower than) those of the ambulatory patients with AIDS. If treatment with antipsychotics improved a psychiatric patient's QWB score (mean = 0.58) to the level of the normal subjects in our study (0.71), 13 (= 0.13 × 100) well years would be generated for every 100 patients treated successfully. These numbers, combined with the cost of treatment, could then be used to generate the cost-utility ratio of dollars per well year generated. This type of analysis can be used in an objective determination of the relative financial and medical benefits of various treatment regimens.

This study has several methodological limitations. The normal comparison group, for example, was not matched with the group of patients with psychosis on several demographic variables. Some of these differences (e.g., normal subjects being older) might actually have served to reduce the difference between the groups on the QWB, while others (e.g., gender) probably had no significant effect on the QWB score. It is also worth noting that age and gender did not predict the QWB score in the multiple regression analysis. We cannot rule out the possibility of a Type I error resulting from a large number of analyses, although the near uniformity of findings, and the conservative α level ($P < 0.001$) that we used in univariate two-tailed analyses would suggest that this is not likely to have been the case. There is a need for studies with better-matched control groups, and studies using other psychiatric (e.g., major depression) com-

parison groups. The results from this study may not be generalizable to nonpsychotic patients with other mental disorders. Finally, longitudinal prospective studies looking at the relationship of both therapeutic and adverse effects of treatment on the QWB are warranted. Recognizing these important limitations, we encourage more investigation into the validity of general health measures for severe mental health problems such as psychosis.

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