Quality of Life in Schizophrenia: The Impact of Psychopathology, Attitude Toward Medication, and Side Effects

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Background: Quality of life (QOL) is now seen as a key outcome variable in schizophrenia. Factors deemed relevant in this context include severity of symptoms, antipsychotic-induced side effects, sociodemographic variables, and patients' subjective response to medication.

Method: In the current cross-sectional study, 80 patients with a schizophrenic disorder according to ICD-10 criteria who had a duration of illness over 1 year and whose discharge from an inpatient unit had been at least 6 weeks earlier were investigated. Apart from the registration of demographic data, various rating scales were used: the Positive and Negative Syndrome Scale (PANSS), the St. Hans Rating Scale for Extrapyramidal Syndromes, the UKU Side Effect Rating Scale, the Drug Attitude Inventory, and the Lancashire Quality of Life Profile.

Results: More than half of all patients (47/80) indicated that they were satisfied with their life in general. The specific areas of subjective dissatisfaction that were most commonly noted in the present sample concerned partnership and mental health. The depression/anxiety component of the PANSS, parkinsonism, and a negative attitude toward antipsychotic medication negatively influenced the patients' QOL, while cognitive symptoms and employment status correlated with higher QOL.

Conclusion: Our results highlight the importance of recognizing the complex nature of QOL in schizophrenia patients. They suggest that special attention should be paid to patients who experience anxiety and depressive symptoms or parkinsonism, to those who are unemployed, and to those with negative feelings and attitudes toward antipsychotics.

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Although the control of positive symptoms is often regarded as the primary goal of treatment in schizophrenia, in recent years, improving patients' quality of life (QOL) has been considered an increasingly important objective of treatment.[1–3] As many individuals suffering from psychotic disorders frequently experience disturbed thinking as well as a range of neurocognitive deficits, clinicians have traditionally been suspicious of the subjective assessments of patients when evaluating treatment outcomes. However, there has been a growing body of research demonstrating that such assessments can be both measured and quantified reliably.[4–6] For example, Voruganti et al.[6] have demonstrated that patients' self-reports measured weekly over a 4-week period were highly consistent, implying considerable reliability of reporting. Remarkably, patients with high levels of symptoms were as reliable in their reports as were patients with low levels of symptoms, suggesting that severity of illness does not in itself undermine the ability of patients to report their experiences consistently.

Several factors can affect QOL; among them are severity of symptoms, age, antipsychotic-induced side effects, and patients' subjective response to medication.[3,7,8] Among psychopathologic symptoms, depressed mood and anxiety seem to be associated with a worse QOL, whereas the association between positive or negative psychotic symptoms and subjective QOL is more uncertain. Older patients seem to be more satisfied with their lives than their younger counterparts.[9–15] Awad et al.[16] have investigated the contribution of both symptoms and treatment-related adverse effects to subjective well-being and found that severity of symptoms and subjective distress caused by neuroleptic dysphoria and akathisia accounted for nearly half of the variance in a subjective measure of QOL. The distress resulting from akathisia and its far-reaching impact on clinical stability, well-being, and even the rate of suicide have been remarked on by a number of other authors,[17–19] whereas other extrapyramidal motor side effects (EPS) such as hypokinesia and dyskinetic movements have been reported to be subjectively less distressing for patients.[20] Given the strong relationship between dopamine D_2 receptor occupancy, EPS, and neuroleptic dysphoria,[21,22] one might reasonably predict a discernible

difference in subjective response to first- and second-generation antipsychotics, which clearly differ with regard to their risk of inducing EPS and of blocking nigrostriatal D_2 receptors.[23,24] However, other adverse effects such as sedation, body weight gain, sexual dysfunction, and hypersalivation occur to differing degrees with the new treatments and can also be expected to influence QOL.

In a previous study of stable outpatient clinic attendees with schizophrenia, we found that positive symptoms, sedation as a side effect, and employment were associated with negative attitudes toward antipsychotics.[25] We have now investigated an extended sample to examine the impact of psychopathology, antipsychotic-induced side effects, attitude toward medication, and sociodemographic and illness-related factors on QOL in outpatients with schizophrenia.

The following questions were investigated: (1) Is there a relationship between psychopathology and subjective QOL? (2) Is there a relationship between antipsychotic-induced side effects and subjective QOL? (3) Is there a relationship between QOL and attitude toward medication that is independent of the associations between psychopathology/antipsychotic-induced side effects and attitude toward medication?

METHOD

We performed a cross-sectional study that included 80 patients with schizophrenia between the ages of 19 and 60 years from public outpatient mental health services. All subjects had a duration of illness of over 1 year and had been discharged from an inpatient unit at least 6 weeks before. The diagnostic criteria of a schizophrenic disorder according to ICD-10, which were applied clinically without using a formal instrument, served as a basis for study inclusion after patients had consented in writing to participate. Apart from the registration of demographic data, various rating scales were utilized. Psychopathology was rated by means of the Positive and Negative Syndrome Scale (PANSS).[26] The PANSS was divided according to the model of Lindenmayer et al.[27,28] into 5 dimensions: (1) negative component (including the blunted affect, emotional withdrawal, poor rapport, passive social withdrawal, lack of spontaneity, and active social avoidance subscales), (2) excitement component (including the excitement, hostility, uncooperativeness, and poor impulse control subscales), (3) cognitive component (consisting of the conceptual disorganization, difficulty in abstract thinking, mannerisms and posturing, disorientation, and poor attention subscales), (4) positive component (including the delusions, hallucinatory behavior, grandiosity, suspiciousness, stereotyped thinking, and unusual thought content subscales), and (5) depression/anxiety component (consisting of the anxiety, guilt, tension, and depression subscales).

To quantify side effects, the St. Hans Rating Scale for Extrapyramidal Syndromes[29] and the UKU Side Effect Rating Scale[30] were used. The St. Hans scale consists of 4 subscales: an akathisia subscale, a dystonia subscale, a parkinsonian subscale, and a dyskinesia subscale. Each item is scored from 0 (no side effect) to 6 (side effect extremely severe). The UKU comprises a total of 48 symptoms, arranged into 4 groups: psychic, neurologic, autonomic, and other side effects. Each symptom is scored on a severity scale from 0 (no side effect) to 3 (side effect that interferes markedly with patient's performance), and the rater assesses whether the report is best attributed to a side effect (rated as improbable, possible, or probable) or to the disease. For the purpose of subsequent statistical analysis, patients with a score of 2 or higher on any item of the St. Hans scale or a score of 1 or higher on any UKU item were considered side effect "cases."

The patients' subjective response to antipsychotics and their attitudes toward medication were assessed by means of the Drug Attitude Inventory (DAI),[31] a self-report questionnaire consisting of statements about perceived effects and benefits of antipsychotics with which the patient can agree or disagree. It is divided into 7 factors: (1) subjective positive feelings related to antipsychotics (e.g., feeling happier), (2) subjective negative feelings attributed to the drugs (e.g., feeling tired and sluggish), (3) health/illness-dependent drug intake: patients' model of health (e.g., believing it is unnatural to take medication), (4) patients' confidence in physician (e.g., believing it is up to the doctor when one stops taking medication), (5) control: patients' attitudes toward the locus of control in taking medication (e.g., feeling pressured to ingest medication), (6) prevention: patients' belief in the effect of antipsychotics in forestalling relapse (e.g., antipsychotics can prevent one's getting sick), and (7) harm: patients' concerns with potential toxic effects (e.g., believing medication is a slow-acting poison). Each item of the DAI is scored as 1 (answer selected by patient indicates a positive view of medication) or 2 (answer selected by patient indicates a negative view of medication).

The assessment of the patients' QOL was based on concepts developed by Lehman[32] and Oliver et al.[33] emphasizing that (1) there are both subjective and objective determinants of a person's QOL and (2) a person's QOL is reflected by a general sense of well-being as well as by an appraisal of individual life domains. The questionnaire used to assess QOL in the present study, the German translation[34] of the Lancashire Quality of Life Profile,[33] adheres to these concepts. Validity properties of the instrument and its translation have been shown to be satisfactory.[35] The parts of the questionnaire addressing self-esteem and affect, which are not included in the translation,[34] were translated by the authors. Nine life domains are included in the profile: work/occupation, leisure, financial situation, housing, safety, family, partner-

ship, friends, physical health, and mental health. The items of each of these domains can be divided into 2 categories: those related to objective or functional QOL and those related to subjective QOL. The former category comprises questions on living conditions (e.g., income) and functioning in daily life (e.g., leisure time activities), and the latter reflects the patient's satisfaction with the individual life domains or aspects thereof as well as his or her psychological well-being. Subjective items are scored on a 7-point scale ranging from completely dissatisfied (1) to completely satisfied (7), with alternately satisfied and dissatisfied (4) as a midpoint. Subscores for satisfaction with individual life domains result from averaging the individual satisfaction scores within domains. Psychological well-being is assessed by means of 2 subscales, the first measuring self-esteem (developed by Rosenberg[36]), and the other, affect (original version by Bradburn[37]). Both subscales allow a "positive" (positive affect or self-esteem) and a "negative" subscore as well as a total score to be formed. The questionnaire concludes with a single item on general life satisfaction ("At this moment, how satisfied do you feel with your life as a whole?"), again to be answered on a 7-point scale.

In each case, ratings were performed by an independent psychiatrist who was not involved in the treatment of the patient. The study was approved by the Ethical Committee of the Medical Faculty of Innsbruck University.

Statistical Analysis

The subscales of the Lancashire QOL Profile and the DAI were analyzed according to the instructions of the developers. Descriptive summary statistics for the total sample were calculated for sociodemographic and clinical patient characteristics, psychopathology (PANSS), drug attitude (DAI), and antipsychotic-induced side effects (St. Hans scale, UKU). The relationship between QOL and patient characteristics, psychopathology, type of antipsychotic medication, side effects, and attitude toward medication was studied by means of correlational and multiple linear regression analyses. To reduce the number of variables considered in the correlation and regression analyses, the total set of 7 DAI subscales was condensed to 3 by means of a factor analysis: "positive feelings and effects" (including the original subscales subjective positive feelings, confidence in physician, and prevention), "negative feelings and effects" (including the subscales subjective negative feelings, harm, and control), and "health/illness-dependent drug intake" (equal to the original subscale).[25]

As this study was exploratory, we report trends as well as significant findings. The linear regression consisted of a sequential procedure in order to cut down the number of independent variables considered in an individual analysis. In a first step, only patient characteristics were used as independent variables, namely age, sex, duration of illness, existing partnership, and work, including sheltered work of at least 20 hours/week. Statistically significant variables were selected by stepwise backward variable elimination. In a second step, the statistically significant or nearly significant variables ($p < .1$) of the first step plus the PANSS subscales, important side effects (St. Hans scale, UKU), and type of antipsychotic medication were entered as independent variables. The same variable selection procedure described above was used. Side effects considered relevant were akathisia, parkinsonism, dyskinesia, sedation, depression, diminished sexual desire, and hypersalivation. Similarly, in the last step of the regression analysis, the 3 subscales of the DAI, as defined above, were added.

Table 1. Characteristics of 80 Schizophrenia Patients

Characteristic	Value
Age, mean ± SD, y	37.3 ± 11.7
Sex, %, female/male	22/78
Duration of illness, mean ± SD, y	11.7 ± 10.7
Time since discharge, mean ± SD, mo	27.2 ± 38.0
PANSS score, mean ± SD[a]	
Negative	2.47 ± 1.24
Excitement	1.19 ± 0.31
Cognitive	1.66 ± 0.64
Positive	1.64 ± 0.72
Depression/anxiety	1.76 ± 0.68
Antipsychotic treatment, N (%)	
First-generation antipsychotics	21 (26)
Second-generation antipsychotics	59 (74)
Daily dose, mean ± SD, mg	
First-generation antipsychotics (chlorpromazine equivalents)	358.4 ± 284.0
Risperidone (N = 12)	4.3 ± 1.8
Olanzapine (N = 12)	11.2 ± 4.3
Clozapine (N = 29)	296.6 ± 110.1
Zotepine (N = 3)	316.7 ± 160.7
Sertindole (N = 1)	8.0
Amisulpride (N = 1)	400
Ziprasidone (N = 1)	160
Housing, N (%)	
With original family	28 (35)
With own family	8 (10)
Alone	21 (26)
In a small group home	17 (21)
Other	6 (8)
Marital status, N (%)	
Single	60 (75)
Married/stable partnership	14 (18)
Divorced/widowed	6 (7)

[a]PANSS components were defined according to the Lindenmayer 5-factor model[27,28] and scored on a scale of 1 (symptom not present) to 7 (symptom extremely severe).
Abbreviation: PANSS = Positive and Negative Syndrome Scale.

RESULTS

Patient Characteristics

Demographic and clinical characteristics of the study sample are summarized in Table 1. The majority of the patients were male, their mean age was 37 years with a mean duration of illness of approximately 12 years. Regarding psychopathology (PANSS), patients had low-to-moderate negative symptomatology and fairly few other symptoms.

In terms of the Lindenmayer 5-factor model, negative symptoms showed the highest mean score, followed by depression/anxiety, while the scores for positive symptoms, cognitive symptoms, and excitement were generally low. About one quarter of the patients were treated with conventional antipsychotics, the others with second-generation antipsychotics.

Antipsychotic-Induced Side Effects

The most frequently reported antipsychotic-induced side effects (St. Hans scale, UKU) included sedation (41% [N = 33]), depression (40% [N = 32]), and diminished sexual desire (39% [N = 31]). Moreover, weight gain was observed in 37% (N = 30) of patients (conventional antipsychotics: 19% [4/21], second-generation antipsychotics: 44% [26/59]) and parkinsonism, in 33% (N = 26) (conventional antipsychotics: 47% [10/21], second-generation antipsychotics: 29% [17/59]). Hypersalivation was reported in 33% (N = 26) of patients and erectile dysfunction, in 27% (17/62) of male patients. Mild-to-moderate akathisia was reported in 23% (N = 18) of all patients. As expected, there was a higher incidence of parkinsonism in the group treated with conventional antipsychotics, while weight gain was considerably more frequent in subjects treated with second-generation antipsychotics. Because of the limited sample size in the group treated with conventional antipsychotics, no significance tests were performed.

Quality of Life

An overview of the patients' QOL, as assessed by the Lancashire QOL Profile, is given in Table 2. Of the life domains assessed, partnership and mental health received the lowest satisfaction ratings, while safety, housing, and family had the highest ratings. Satisfaction with work/occupational situation was rated higher by patients with regular or sheltered work than by those without work (mean score = 5.30 vs. 4.56, p = .034). Similarly, the scores for satisfaction with the patient's partnership situation were higher in patients with a stable partner than in those without (mean score = 5.57 vs. 4.26, p = .011). The scores for the self-esteem subscale were generally fairly high (72.5% [N = 58] of the patients had a score above the midpoint of the scale), while affect received considerably lower ratings (only about 50% [N = 42] had a score above the midpoint of the scale). More than half of all patients (59% [N = 47]) indicated that they were satisfied with their life in general.

Attitude Toward Medication

Patients' attitude toward antipsychotic medication, as measured by the DAI, was generally positive, which is reflected by a mean ± SD total DAI score of 74.8 ± 16.4 on a scale from 0 (completely negative attitude) to 100 (completely positive attitude). Only 8.9% (N = 7) of the patients had a total DAI score below 50, the midpoint of the scale. Of the subscales describing positive aspects of antipsychotic medication, the highest mean score and thus the highest assent was for relapse prevention (90.6 ± 25.3) (followed by confidence in physician with a mean score of 88.6 ± 26.5). None of the subscales characterizing negative aspects of antipsychotic medication received high mean scores (illness-dependent drug intake: 36.2 ± 34.9, subjective negative feelings: 27.5 ± 25.2, harm: 20.0 ± 30.4, control: 6.9 ± 19.1).

Table 2. Lancashire Quality of Life Profile Scores[a]

	Score		Patients with a Favorable Quality of Life[b]	
Subscale	Mean	SD	N	%
Satisfaction subscale				
Work/occupation	4.99	1.56	46	57.5
Leisure	5.11	1.35	48	60.0
Financial situation	4.92	1.56	46	57.5
Housing	5.68	1.07	61	76.3
Safety	6.00	0.95	74	92.5
Family	5.54	1.34	63	78.7
Partnership[c]	4.49	1.76	38	47.5
Friends	5.15	1.29	54	67.5
Physical health	5.03	1.41	50	62.5
Mental health	4.70	1.49	42	52.5
General life satisfaction	4.85	1.30	47	58.8
Self-esteem	7.24	2.20	58[d]	72.5[d]
Affect[e]	5.96	2.11	42[d]	52.5[d]

[a]Range of possible scores was 1 (completely dissatisfied) to 7 (completely satisfied) for the satisfaction subscales and for general satisfaction and 1 (completely dissatisfied) to 10 (completely satisfied) for self-esteem and affect.
[b]Proportion of patients with a mean score of 5–7 (rather satisfied, satisfied, or completely satisfied) on the 7-point satisfaction scale.
[c]Patients without a partner were asked to report their satisfaction with not having a partner.
[d]Proportion of patients with a score ≥ 6.
[e]This subscale is identical to the Affect Balance Scale by Bradburn.[37]

Association of Quality of Life With Sociodemographics, Psychopathology, Side Effects, and Attitude Toward Medication

Correlations of QOL summary scores with sociodemographic variables, psychopathology, antipsychotic-induced side effects, and attitude toward medication are shown in Table 3. Age was significantly correlated with general life satisfaction (higher satisfaction with increasing age), but not with the other QOL subscales. Having a job, including sheltered work, was correlated with increased scores on general life satisfaction, affect, and self-esteem. The positive component of the PANSS was negatively associated with affect and self-esteem but not with the patients' general life satisfaction. Similarly, negative symptoms showed a negative correlation with self-esteem but not with general life satisfaction, whereas depression/anxiety was negatively associated with all 3 Lancashire QOL Profile subscales considered. The cognitive component of the PANSS showed a negative correlation with the

Table 3. Correlations of General Life Satisfaction, Affect, and Self-Esteem With Sociodemographics, Psychopathology, Type of Antipsychotic Medication, Antipsychotic-Induced Side Effects, and Attitude Toward Medication[a]

	Lancashire Quality of Life Profile Subscale		
Variable	General Life Satisfaction	Affect	Self-Esteem
Sociodemographics			
Age	0.24*	0.09	0.03
Sex (female vs male)[b]	0.12	–0.04	0.03
Married/stable partner (vs no partner)[b]	0.06	0.08	–0.08
Work or sheltered work (vs no work)[b]	0.32**	0.40**	0.24*
Psychopathology (PANSS)[c]			
Negative	0.12	–0.15	–0.29**
Excitement	0.21	–0.11	0.02
Cognitive	0.30**	–0.09	–0.23*
Positive	0.06	–0.22*	–0.30**
Depression/anxiety	–0.27**	–0.26**	–0.39**
Antipsychotic medication			
Second-generation (vs first-generation)[b]	–0.08	0.01	0.07
Side effects[d]			
Weight gain	–0.04	–0.07	–0.10
Sedation	–0.02	–0.05	–0.05
Parkinsonism (St Hans scale[29])	–0.12	–0.24*	–0.45**
Akathisia (St Hans scale)	0.03	–0.15	–0.32**
Diminished sexual desire	0.01	–0.07	–0.11
Erectile dysfunction (men, N = 62)	–0.10	–0.39**	–0.24(*)
Depression	–0.28*	–0.25*	–0.22*
Attitude toward medication (DAI)			
Positive feelings and effects	–0.07	–0.15	–0.09
Negative feelings and effects	–0.05	–0.30**	–0.32**
Illness-dependent drug intake	0.04	0.08	–0.13

[a]Unless stated otherwise, table entries are Pearson correlation coefficients.
[b]Spearman correlation coefficient.
[c]PANSS components as defined by the Lindenmayer 5-factor model.[27,28]
[d]If not stated otherwise, side effects were rated by means of the UKU Side Effect Rating Scale.[30]
(*)$p < .1$.
*$p < .05$.
**$p < .01$.
Abbreviations: DAI = Drug Attitude Inventory, PANSS = Positive and Negative Syndrome Scale.

patients' self-esteem but a positive association with their general life satisfaction. When the traditional subscales of the PANSS were used (rather than the 5 dimensions defined by Lindenmayer et al.[27,28]), the correlations of the positive and the negative symptoms subscales with general life satisfaction, affect, and self-esteem remained basically unchanged (i.e., they were almost identical to the values listed in Table 3). Both the general psychopathology subscale and the total PANSS score showed significant negative correlations with affect ($r = –0.23$ and $r = –0.22$, respectively; $p < .05$) and self-esteem ($r = –0.40$ and $r = –0.38$, respectively; $p < .001$).

Type of antipsychotic medication (first- vs. second-generation) was not significantly associated with QOL. Therefore, no subdivision of the sample according to type of medication was made for the analysis of the relationship between antipsychotic-induced side effects and QOL. Only a few of the antipsychotic-induced side effects tested yielded significant correlations with QOL subscales. Depression was the only one that was negatively associated with general life satisfaction. Depression was also associated with reduced affect scores and reduced self-esteem. Moreover, parkinsonism and erectile dysfunction were associated with lower scores in both affect and self-esteem (the correlation of erectile dysfunction and self-esteem reached only a trend level; $p < .1$). Akathisia was also associated with lower values on the self-esteem subscale.

Regarding the patients' attitude toward antipsychotic medication, negative feelings and effects were associated with lower scores in both affect and self-esteem, but not in general life satisfaction. Neither positive feelings and effects nor illness-dependent drug intake showed a significant association with any of the Lancashire QOL Profile subscales.

The Lancashire QOL Profile satisfaction subscales for the individual life domains (e.g., work, financial situation) showed few noteworthy correlations with the PANSS subscales, antipsychotic-induced side effects, or attitude toward medication. As the few correlations that reached a nominal p value of $\leq .05$ would not withstand a correction for multiple testing, they are not presented.

Results of Multiple Linear Regression Analysis

The combined effects of sociodemographic variables, psychopathology, type of antipsychotic medication,

Table 4. Effects of Sociodemographic Variables, Psychopathology, Antipsychotic-Induced Side Effects, and Attitude Toward Medication on Quality of Life (multiple linear regression analysis)

Dependent Variable (Lancashire QOL Profile subscale)	Independent Variable	Direction of Effect	Partial Correlation[a]	p Value	R^2
General life satisfaction					0.367
	Work	↑	0.33	.005	
	Cognitive symptoms (PANSS)	↑	0.41	.000	
	Depression/anxiety (PANSS)	↓	–0.23	.045	
	Parkinsonism	↓	–0.27	.021	
Affect					0.253
	Work	↑	0.42	.000	
	Negative feelings and effects (DAI)	↓	–0.33	.003	
Self-esteem					0.337
	Depression/anxiety (PANSS)	↓	–0.34	.003	
	Parkinsonism	↓	–0.36	.000	
	Negative feelings and effects (DAI)	↓	–0.25	.026	

[a]Partial correlation of independent variable with the dependent (quality-of-life) variable, adjusting for the other independent variables in the model.
Abbreviations: DAI = Drug Attitude Inventory, PANSS = Positive and Negative Syndrome Scale, QOL = quality of life. Symbols: ↑ = higher values of independent variable were associated with higher quality-of-life scores, ↓ = higher values of independent variable were associated with lower quality-of-life scores.

antipsychotic-induced side effects, and attitude toward medication on QOL were analyzed with multiple linear regression analysis, which is summarized in Table 4. Regarding general life satisfaction, the only sociodemographic variable remaining in the model as a significant predictor was work, and the only antipsychotic-induced side effect that remained significant was parkinsonism. Two of the PANSS factors contributed significantly to general life satisfaction, namely depression/anxiety (negatively associated with general life satisfaction) and cognitive symptoms (positively associated with general life satisfaction). None of the DAI subscales was significantly associated with general life satisfaction after adjustment for the other independent variables. In the regression model for affect, only 2 variables were found to be significant predictors, namely work (positively associated with the dependent variable) and the DAI negative feelings and effects subscale (negative association with affect). Neither the PANSS subscales nor any of the antipsychotic-induced side effects proved to be statistically significant after adjustment for the other independent variables. Significant predictors of self-esteem were the depression/anxiety component of the PANSS, parkinsonism, and negative feelings and attitudes toward antipsychotic medication. All of these variables were negatively associated with the self-esteem score.

DISCUSSION

Symptom severity, level of psychosocial functioning, and the presence of medication side effects have been described as major determinants of QOL in schizophrenia.[38] Furthermore, it has been suggested that QOL may be influenced by the patient's subjective response to antipsychotic medication.[39] The present study is a descriptive, cross-sectional survey of stable outpatients with schizophrenia receiving various antipsychotics in naturalistic treatment settings. It was conducted to determine eventual associations between QOL and psychopathology, antipsychotic-induced side effects, attitude toward medication, and sociodemographic and illness-related factors. In general, as shown in Table 1, this sample was a patient group with some residual symptoms living in a stable social environment, which might be comparable with outpatients treated in other countries. However, selecting a sample in this way clearly limits the generalizability of the collected data, since early noncompliers, who usually stop attending outpatient services, are not included.

Corresponding to the findings of other researchers,[11,40,41] the specific areas of subjective dissatisfaction most commonly described in our sample concerned partnership and mental health. However, more than half (47/80) of all patients indicated that they were satisfied with their lives in general. At first this finding seems remarkable, since one would expect patients with a severe chronic mental disease to have a relatively low QOL. Following Larsen and Gerlach,[20] we hypothesize that the relatively long duration of illness of about 12 years may have enabled our patients to accept their illness and therefore adjust their expectations of life, their state of health, and their available resources. This explanation would be in line with our finding that older patients were more satisfied with their lives than younger ones. Moreover, most of the participants were satisfied with those areas of life considered crucial from a social psychiatric point of view, namely housing, safety, and quality of social and family relationships. However, when interpreting our data, one must account for a possible bias of patients in reporting subjective satisfaction in order to present themselves

well, perhaps as a gesture to please their doctors. Lack of insight, not measured in this study, may also have contributed to bias.

Regarding sociodemographic factors, we found a positive association between employment and QOL, which is in agreement with the findings of Hansson et al.[15] This association is not as self-evident as it may appear, as one could suspect that some of the cognitive impairments caused by the disorder, as well as the stigma attached to schizophrenia and its treatment, can actually lead to considerable difficulties, especially in the nonsheltered workplace.

The most frequently observed side effects in our sample were similar to those previously reported.[42] Parkinsonism was the only one that adversely affected general life satisfaction and self-esteem in a multiple linear regression analysis. This finding is of special interest, as most patients (74%) were treated with second-generation antipsychotics, which are less likely to lead to extrapyramidal symptoms.[21] Apparently, typically observed side effects of second-generation antipsychotics such as sedation or weight gain influenced the patients' QOL to a lower extent than those side effects that are induced by dopamine D_2 receptor occupancy. These findings are consistent with those of Voruganti et al.,[43] who have reported significant improvements in patients' QOL after they were switched from first- to second-generation antipsychotics, thereby reducing EPS. However, although some side effects did not influence QOL in the overall regression analysis, there were distinct relationships when side effects were analyzed separately. Akathisia was associated with reduced self-esteem, and erectile dysfunction was linked to both lower scores on affect and, at a trend level, reduced self-esteem. Furthermore, patients experiencing depression as a side effect had lower scores on general life satisfaction, affect, and self-esteem. The fact that these side effects did not remain significant in the overall regression analysis may be a reflection of sample size and selection, as outlined above.

Regarding psychopathology, the depression/anxiety component of the PANSS was negatively associated with both general life satisfaction and self-esteem, while the cognitive component was positively correlated with general life satisfaction in the overall regression analysis. These findings are in agreement with those of other researchers. For example, Gaite et al.[44] have investigated patients with schizophrenia from 5 European countries and found an inverse association between depression/anxiety and QOL, and Koivumaa-Honkanen et al.[45] have noted that depression is associated with reduced self-esteem. The fact that cognitive symptoms positively influenced the patients' general life satisfaction seems at first surprising. However, this finding corroborates that of a recent study[46] examining the influence of neurocognitive deficits on the relationship between psychosocial functioning and QOL. Among a schizophrenia sample with low levels of psychosocial functioning, those patients with impaired executive abilities displayed a positive association between psychosocial functioning and satisfaction with life, while patients with intact executive functions displayed an inverse association between these domains.

On the other hand, a correlation analysis in the present study revealed significant associations between other psychopathologic symptoms and subjective QOL. Corresponding to other reports,[3,9,11,12,44,47] affect was inversely associated with both the positive and the depression/anxiety component of the PANSS, and self-esteem was diminished in patients experiencing negative, cognitive, or positive symptoms.

Earlier reports suggest that the subjective response to medication is associated with QOL.[38,39,48] Accordingly, negative feelings and attitudes toward antipsychotics were linked to reduced ratings of affect and self-esteem in our sample (even after adjustment for sociodemographics, psychopathology, and drug side effects), while neither the positive feelings and effects subscale of the DAI nor the health/illness-dependent drug intake subscale was associated with QOL. If DAI scores, as suggested by the authors of the instrument,[31] represent an indirect indicator of compliance, we emphasize the importance of closely monitoring patients' subjective attitudes, as they may impinge directly on adherence to treatment and secondarily on QOL.

As discussed above, the sample investigated in this study consisted of clinically stable patients who regularly attend outpatient services, which allows staff to actively elicit and respond to patients' concerns. As this study was cross-sectional, it will be critical to generate longitudinal follow-up data to determine how the associations among the determinants of QOL in patients with schizophrenia interact and change over time.

Drug names: chlorpromazine (Thorazine, Sonazine, and others), clozapine (Clozaril, Fazaclo, and others), olanzapine (Zyprexa), risperidone (Risperdal), ziprasidone (Geodon).

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