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Clinician-rated functioning and patient-rated quality of life in schizophrenia: Implications of their correspondence for psychopathology and side effects

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ABSTRACT

Objective: Past studies have found inconsistent associations between subjective and objective measures of quality of life (QOL) in schizophrenia. We hypothesized that this may be due to heterogeneity in the demographic and/or clinical variables inherent in the samples and we investigated this possibility.
Methods: We stratified the patients according to a descriptive measure of correspondence between self-reported QOL and clinician-rated functioning. We then examined whether heterogeneous patterns existed among the subgroups in terms of demographic variables, symptom severity, associations between self-reported and clinician-rated psychopathology and associations between side effects, QOL and functioning.
Results: The subgroups significantly differed with respect to clinician-rated positive symptoms ($F=3.075$, $p<.05$), subjective symptoms (somatization, $F=5.768$, $p<.01$; obsessive–compulsive, $F=3.885$, $p<.05$; interpersonal sensitivity, $F=8.278$, $p<.001$; depression, $F=9.368$, $p<.001$; anxiety, $F=6.909$, $p<.01$; hostility, $F=7.787$, $p<.01$; phobic anxiety, $F=9.551$, $p<.001$; paranoia, $F=5.304$, $p<.01$; psychoticism, $F=5.071$, $p<.01$) and in- and outpatient ratio ($X^2=11.58$, $p<.01$). Only the subgroup with relatively good correspondence between clinician-rated functioning and self-reported QOL showed significant low to moderate associations between the aforementioned measures and side effects. In addition, they showed similar levels of significant associations between the positive and subjective symptoms. In contrast, other discordant subgroups lacked overall associations between side effects, functioning and QOL as well as between subjective and objective measures of psychopathology.
Conclusion: Low to moderate levels of correspondence between subjective QOL and objective functioning were partly supportive of the independence of the constructs. Insight is likely to be a mediating variable of the correspondence between self-report and clinician-rated measures and should be considered in studies using self-report measures.

1. Introduction

Improving the quality of life (QOL) of patients has become the primary treatment goal for schizophrenia in addition to mitigating active symptoms (Karow and Naber, 2002; Naber et al., 2001). This is well illustrated by the fact that the negative impact of side effects of antipsychotics on the functioning and subjective well-being of patients has recently become a major topic of clinical research (Hamer and Haddad, 2007) because patients consider the side effects to be a significant burden on their QOL (Bebbington et al., 2009; Yamauchi et al., 2008; Naber et al., 2005; Zhang et al., 2004).

Unfortunately, recent reports on the relationship between subjective and objective QOL assessments in patients with schizophrenia have been inconsistent (Yamauchi et al., 2008; Heider et al., 2007; Lysaker et al., 2006; Melle et al., 2005). The ability of patients with schizophrenia to feel, experience and report their social deficits has been allegedly demonstrated by some studies, and the perspectives on QOL research in schizophrenia have shifted from clinical assessments to self-reports by patients (Aki et al., 2008; Bowie et al., 2007; Kugo et al., 2006; Dickerson et al., 1998; Atkinson et al., 1997; Carpiniello et al., 1997). In this process, however, discrepancies among reports about QOL in schizophrenia, particularly between those using either objective or subjective measures of QOL, have emerged (Bowie et al., 2007). These discrepancies were often attributed to methodological issues, such as using only a selective set of questions or rating only objective (or subjective) QOL, despite some evidence showing

Abbreviations: CI, Corresponding Index; GAF, Global Assessment of Functioning; LSRS, Life Satisfaction Rating Scale; MS, Manchester Scale; QOL, quality of life; SCL-90-R, Symptom Checklist-90 — Revised.

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that patient and clinician perceptions of QOL may be somewhat different (Wehmeier et al., 2007; Voruganti et al., 2000). Some have even argued that objective ratings of QOL by clinicians cannot substitute for the subjective self-evaluations of patients (Terada et al., 2002). A lack of consistent or strong associations among measures in studies that used both measures of QOL (Melle et al., 2005; Lasalvia et al., 2002; Fitzgerald et al., 2001; Ruggeri et al., 2001; Warner et al., 1998; Atkinson et al., 1997) appears to provide further support for the argument that objective and subjective measures of QOL may be independent.

It is possible, however, that the apparent independence of objective and subjective measures of QOL may have stemmed from differences in other variables that affect patient and clinician evaluations. For example, depressive symptoms have been reported to influence patient-rated QOL (Aki et al., 2008; Heider et al., 2007; Kugo et al., 2006; Bechdolf et al., 2003; Fitzgerald et al., 2001; Dickerson et al., 1998; Atkinson and Caldwell, 1997; Carpiniello et al., 1997; Mechanic et al., 1994), while specific clinical variables, including negative symptoms or psychosocial performance, have been reported to determine observer-rated QOL (Aki et al., 2008; Narvaez et al., 2008; Dernovsek et al., 2001; Fitzgerald et al., 2001). Hence, a patient sample consisting of heterogeneous subgroups that significantly differ in severity of certain psychopathological symptoms is likely to show weaker or less consistent associations between the patient- and clinician-rated measures of QOL as well as between measures of psychopathology in comparison to a more homogeneous sample with a relatively moderate level of psychopathology. Such inherent heterogeneity often found in schizophrenia patients may even affect the apparent strength of the relationship between the measures of QOL and side effects, since the presence of severe depressive, negative or positive symptoms, all of which often accompany cognitive deficits and lack of insight into illness, may interfere with a more realistic evaluation of the negative impact of side effects on QOL in some subgroups. Overall, such subgroups are prone to reporting a level of life satisfaction that corresponds well neither to their objective level of functioning as rated by clinicians nor to the severity of their side effects.

In this study, we hypothesized that the subgroup of patients whose self-reported level of QOL corresponds most closely with their clinician-rated daily functioning will show stronger associations between QOL measures and side effects and between self-reported and clinician-rated measures of psychopathology relative to the total sample and to the other subgroups. The subgroup with a level of life satisfaction significantly lower than the clinician evaluation of their functioning, on the other hand, may report more subjective symptoms or may make over-generalized connections between their illness and QOL than the other subgroups. In contrast, those reporting a significantly higher level of life satisfaction relative to their objective functioning may be prone to consider their symptoms as unrelated to life satisfaction, causing them to show only weak or sporadic associations between subjective and objective measures of psychopathology and between side effects and measures of QOL. If these hypotheses are confirmed, these differences between subgroups may partly reveal the source of discrepancies between patient-reported and clinician-rated measures found in previous studies.

2. Methods

2.1. Subjects

A total of 110 in- and outpatients with chronic schizophrenia who were undergoing treatment with antipsychotics were recruited from two general hospitals (Boramae Medical Center and Kangnam Sacred Heart Hospital) and three psychiatric hospitals (Seoul National Hospital, Keyo Hospital and Chuk-Ryung Evangelical Hospital) in the Seoul Metropolitan District. The schizophrenia diagnoses of these patients were confirmed by two psychiatrists using the DSM-IV criteria (American Psychiatric Association, 2000). To ensure the cognitive ability of the patients for self-reporting, the vocabulary subscale of the Korean Wechsler Adult Intelligence Scale (Oh et al., 1992) was administered, and all patients achieved a *t*-score of 7 (equivalent to 1 SD below the population mean) or above. All study procedures were carried out after obtaining written consent from the patients, and the study design was reviewed and approved by the Institutional Review Board of the respective hospitals.

2.2. Measures

2.2.1. Clinician-rated measures

The Manchester Scale (MS) is a short and reliable clinical assessment tool for patients with chronic psychosis and has been found to be sensitive to changes in conditions for schizophrenia and other psychoses (Krawiecka et al., 1977). The scale was rated by clinicians (HYJ and JSY) on four domains based on the self-reports by the patients (depression, anxiety, coherently expressed delusions and hallucinations) and four domains based on observation (incoherence and irrelevance of speech, poverty of speech, flattened incongruous affect and psychomotor retardation) by using 5 levels of severity (0–4). One separate domain on a limited number of side effects (tremor, rigidity, dystonic reaction, akathisia, difficulties with vision, tardive dyskinesia, and others) is also rated by the clinician on a three-point severity scale (0–2). We obtained the total score and separate sums for all three subscales. In a previous study, the inter-rater reliabilities of the MS have been reported to be .79 and .83 using different interview methods, which are comparable to or better than those of the Brief Psychiatric Rating Scale (Manchanda et al., 1986). As for the objective level of clinician-rated general functioning, the Global Assessment of Functioning (GAF**:** American Psychiatric Association, 2000), the most widely used measure of psychiatric patient function, was applied. The GAF allows clinicians to rate global patient function on a single scale ranging from 1 to 100, with higher scores indicating better functioning. The GAF has also proven to have excellent inter-rater reliability of .81 with 81 raters (Söderberg et al., 2005) and has also been shown to maintain high reliability in a 1-year longitudinal study (Startup et al., 2002). The Korean version of the GAF also has reached an inter-rater reliability of .91 (Yi et al., 2003). To ensure consistency, the GAF was rated by the same respective clinician.

2.2.2. Self-report measures

Originally designed for use with psychiatric outpatients, the Symptom Checklist-90-Revised (SCL-90-R: Derogatis et al., 1976; Derogatis, 1977) was suggested to be one of the best self-report outcome instruments (Burlingame et al., 2005), with its reliability supported by a wealth of normative data in Korea (Kim and Kim, 1984; Kim and Yoon, 1985). Patients respond to 90 items that are aggregated on nine symptom dimensions (somatization, obsessive–compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation and psychoticism) with a five-point severity scale (0–4). The three global scales (global severity index, positive symptom distress index and positive symptom total) were not analyzed for this study. As for the assessment of subjective QOL, we used the Korean Life Satisfaction Rating Scale (LSRS), which was developed by Yang (1994) for those with mental disabilities. The scale has been standardized and shows good reliability and validity in the Korean general population. The LSRS is a 33-item self-rating scale with a 5-point severity scale. The scale covers eight life domains, which are similar to those of Lehman's Quality of Life Scale (Lehman, 1983): "relationships with family, sense of self and life, friends and interpersonal relations, residential environment, physical and mental health, clothing–eating-economic condition, leisure activities, and occupation and daily activities."

2.2.3. Correspondence index

The correspondence index (CI), which is a descriptive measure of the correspondence (or discrepancy) between the objective (i.e., clinician-rated) level of functioning and subjective (i.e., self-reported)

satisfaction with life, was derived by converting GAF and LSRS total scores into standardized scores and then subtracting the standardized score of the total LSRS from the standardize score of the GAF. Hence, the positive-pole of CI scores signifies the strongest tendency within our sample of patients to deviate toward a negative self-evaluation of QOL relative to the clinician-rated level of functioning (i.e., showing the lowest level of satisfaction with life relative to objective functioning), while the negative-pole indicates the opposite (i.e., showing the highest level of satisfaction with life relative to objective functioning).

2.3. Statistical analysis

The distribution of the CI scores in the total sample was found to be normal (skewness = −.06, kurtosis = −.09). For the purpose of analysis, the patients were stratified into three subgroups according to their CI: those with a CI in the highest quartile (uppermost 25%: >=.892), whose subjective QOL was significantly lower than their clinician-rated functioning, were categorized as "Dissatisfied;" those in the lowest quartile (lowermost 75%: <=−.988), whose subjective QOL was significantly higher than their clinician-rated functioning, were labeled "Satisfied;" and those in between (between 25 and 75%: >−.988 and <.982) were labeled "Realistic." The scores of the total patients and of each subgroup are summarized as means ± standard deviations. The group differences in the demographic and clinical variables were assessed using an analysis of variance (ANOVA). Pearson's correlation analysis was used to examine the relationships among the measures and clinical variables for each subgroup. All statistical analyses were performed using SPSS 11.0 (SPSS Inc., Chicago, Illinois, USA), and a p-value<.05 was considered statistically significant.

3. Results

3.1. Demographic variables

The mean age of all the subjects was 32.2 ± 8.4 years. There were 65 inpatients and 45 outpatients. The mean age at the onset of illness was 23.5 ± 5.7 years and the mean duration of illness was 8.8 ± 6.8 years. Most of the subjects (90.9%) were unmarried singles, unemployed (80.9%) and had 12 or more years of education (87.3%).

The three stratified subgroups consisted of 27 "Dissatisfied," 56 "Realistic," and 27 "Satisfied" patients, as defined as those with highest, middle, and lowest quartile CI indexes, respectively. There were no significant differences among the subgroups in the demographic variables, with the exception of treatment setting (Table 1). When we conducted a *post hoc* analysis on the inpatient/outpatient ratio, there were significantly more inpatients than outpatients in the Satisfied subgroup only ($X^2 = 8.33$, $df = 1$, $p<.01$).

Table 1
Demographic characteristics of subjects stratified into the Satisfied, Realistic and Dissatisfied subgroups ($n = 110$).

Characteristics	Satisfied ($n = 27$)	Realistic ($n = 56$)	Dissatisfied ($n = 27$)	F or X^2
Sex (male/female)	14/13	34/22	19/8	1.946
Age (years)	30.89 ± 7.59	32.75 ± 8.44	32.52 ± 9.30	.460
Age of onset	22.81 ± 5.85	23.77 ± 5.59	23.80 ± 5.74	.290
Duration of illness (years)	8.21 ± 6.24	9.11 ± 7.54	8.70 ± 6.81	.157
Treatment setting (inpatient/outpatient)	21/6	35/21	9/18	11.58**

** $p<0.01$.

3.2. Severity of self-reported and clinician-rated psychopathology

For the clinician-rated measure of psychopathology, the *positive symptoms* subscale of the MS revealed a significant group difference in severity, with the Satisfied subgroup showing the most severe level of positive symptoms, followed by the Realistic and Dissatisfied subgroups (Table 2). In a *post hoc* analysis using the *Scheffé* test, only the difference between the Satisfied and the Dissatisfied subgroups was found to be significant ($p<.05$). As for self-reported symptoms, the subgroups significantly differed in all subscales of the SCL-90-R. In addition, applying the *post hoc Scheffé* test for paired differences, the Satisfied and the Realistic subgroups were not found to be significantly different in any of the subscales, while the Dissatisfied subgroup reported significantly more *obsessive–compulsive*, *anxiety*, *hostility*, *paranoia* and *psychoticism* subscales than the Satisfied subgroup, and significantly more *somatization*, *interpersonal sensitivity*, *depression*, and *phobic anxiety* than the Satisfied and Realistic subgroups together.

3.3. Relationship between self-reported and clinician-rated psychopathology

Table 3 presents the results of the correlation analysis between the positive and negative subscales of the MS and the subscales of the SCL-90-R for the total sample and each subgroup. For the total sample, only the *positive symptoms* subscale of the MS was found to be significantly associated with the *anxiety*, *hostility*, *paranoia* and *psychoticism* subscales of the SCL-90-R, while the *negative symptoms* subscale was not associated with any of the SLC-90-R subscales. For the Realistic subgroup, however, the *positive symptoms* subscale was significantly correlated with all subscales of the SCL-90-R except for the *phobic anxiety* subscale, and the magnitude of the associations was greater than those of the total sample. In addition, significant correlations between the *negative symptoms* subscale of the MS and the *somatization* and *phobic anxiety* subscales of the SCL-90-R were found for the Realistic and Satisfied subgroups, and these were not evident in the total sample. For the Satisfied subgroup, *negative symptoms* were significantly negatively associated with the *interpersonal sensitivity* and *psychoticism* subscales. Finally, no significant correlations were found between the subscales of the two measures in the Dissatisfied subgroup.

3.4. Relationships between side effects, self-reported QOL and clinician-rated general functioning

Table 4 presents the results of the correlation analysis between the MS *side effects* subscale and the GAF and the LSRS. The Realistic subgroup showed a significant negative association between side effects and the GAF that was twice as strong as that of the total sample. The other subgroups did not show significant associations, even though there was no significant difference in the severity of side effects among the subgroups (Table 2). In terms of association between side effects and LSRS, the Realistic subgroup showed a similar pattern of association as the total sample except for the *family relationships* and *clothing–eating-economic conditions* subscales. For the Dissatisfied subgroup, side effects were significantly negatively correlated with only the *physical and mental health* subscale, whereas the Satisfied subgroup did not show any association between side effects and the subscales of the LSRS.

4. Discussion

Discrepancies between patient-rated and observer-rated QOL and psychopathology are frequently reported, for which methodological issues may only be partly accountable. In the present study, we found different profiles of symptoms, side effects and treatment settings (as

Table 2
Differences among the Satisfied, Realistic and Dissatisfied subgroups in severity of symptoms assessed with ANOVA ($n=110$).

		Satisfied ($n=27$)	Realistic ($n=56$)	Dissatisfied ($n=27$)	F
Manchester Scale	Positive	3.22 ± 2.81	2.38 ± 2.60	1.56 ± 1.72	3.075*
	Negative	1.44 ± 1.40	1.29 ± 1.33	1.59 ± 1.28	.501
	Side effects	0.81 ± 1.33	1.41 ± 1.50	1.26 ± 1.02	1.768
SCL-90-R	Somatization	44.81 ± 8.47	44.11 ± 7.24	51.37 ± 13.38	5.768**
	Obsessive–compulsive	43.37 ± 9.18	47.57 ± 10.54	52.00 ± 14.61	3.885*
	Interpersonal sensitivity	45.33 ± 8.84	49.79 ± 10.27	57.11 ± 13.35	8.278***
	Depression	43.33 ± 8.35	48.98 ± 10.11	54.96 ± 10.73	9.368***
	Anxiety	43.85 ± 6.81	49.38 ± 11.25	54.89 ± 13.26	6.909**
	Hostility	43.07 ± 5.09	47.79 ± 9.33	53.07 ± 12.13	7.787**
	Phobic anxiety	48.11 ± 7.27	49.77 ± 8.73	58.81 ± 14.15	9.551***
	Paranoia	46.19 ± 8.02	49.64 ± 12.63	56.59 ± 14.06	5.304**
	Psychoticism	47.48 ± 9.54	52.75 ± 12.58	58.19 ± 14.21	5.071**

*$p<0.05$, **$p<0.01$, ***$p<0.001$.

well as patterns of associations among them) in subgroups stratified according to the degree of correspondence between self-reported QOL and clinician-rated functioning. Furthermore, consistent with our hypothesis, the relationships among the variables in the subgroup with a relatively high correspondence between self-reported QOL and clinician-rated level of functioning were stronger and more consistent than those among discordant subgroups or in the entire sample. Hence, our study has demonstrated that the presence of heterogeneous subgroups may be a viable explanation for the inconsistent results of past studies that have directly attempted to identify the relationships between QOL and psychopathology (Aki et al., 2008; Narvaez et al., 2008; Yamauchi et al., 2008; Lasalvia et al., 2002; Huppert et al., 2001; Dickerson et al., 1998; Awad et al., 1997; Browne et al., 1996; Larsen and Gerlach, 1996; Naber, 1995). Our study also emphasized that simultaneous consideration of both clinician-rated and patient-rated measures is necessary to gain valuable insight into the psychopathology of patients, since the lack of correspondence between self-rated and clinician-rated measures in some subgroups indicates that these measures are useful in both schizophrenia research and treatment.

In our study, we found distinct profiles for the three stratified subgroups. The patients who were significantly more satisfied with their life in comparison with the clinician-rated level of functioning (i.e., the Satisfied subgroup) had significantly more positive symptoms of the MS than the Dissatisfied subgroup, showed significant negative associations between negative symptoms and the *interpersonal sensitivity* and *psychoticism* subscales of the SCL-90-R symptoms and were more likely to be attending inpatient treatment. On the other hand, the Dissatisfied subgroup did not differ from the Realistic subgroup in terms of the severity of positive and negative symptoms of the MS; however, their self-reported symptoms of the SCL-90-R were significantly higher than those of other subgroups, and their side effects were significantly negatively associated with only the *physical and mental health* subscale of the LSRS. As for the Realistic subgroup, while their severity of clinician-rated and self-rated levels of symptoms did not significantly differ from those of the Satisfied subgroup, they showed significant positive associations between the positive symptoms and all but the *phobic anxiety* subscale of the SCL-90-R. In addition, they showed significantly negative associations between the side effects and all but the *family relationship* subscale of the LSRS.

While a previous study has demonstrated that QOL can be reported with a high degree of reliability and concurrent validity by clinically compliant and stable patients with schizophrenia (Voruganti et al., 1998), our results suggest that even better reliability and concurrent validity may be obtained by patients who are able to make a somewhat realistic evaluation of their QOL that corresponds to the clinician-rated level of functioning. These patients are more likely than others to show a better correspondence between self-reported and clinician-rated measures of psychopathology and between QOL measures and side effects. Patients who significantly overrate their life satisfaction relative to their functional level, on the other hand, may be more prone to dissociate their illness, or even their inpatient status, from their evaluation of QOL, partly owing to the presence of positive symptoms. These patients are likely to downplay the severity and relevance of their illness, and self-report measures obtained from them are likely to reflect such characteristic nonchalance concerning the presence of illness or impairments in their daily functioning. Interestingly, this type of patient may be encountered more often than expected as about 30% of chronic patients with schizophrenia have been found to rate themselves as having a high level of functioning on the GAF despite low scores by clinicians on the same measure (Flyckt et al., 1996). In light of this, it may be prudent for clinicians to carefully check for the presence of positive symptoms or a lack of insight in patients who display somewhat inflated levels life satisfaction. In contrast, patients who report high levels of dissatisfaction with life despite relatively unimpaired levels of functioning are more likely to

Table 3
Differences among the Satisfied, Realistic and Dissatisfied subgroups in correlations between the subjective and objective measures of psychopathology.

SCL-90-R	Manchester Scale							
	Positive				Negative			
	Satisfied ($n=27$)	Realistic ($n=56$)	Dissatisfied ($n=27$)	Total ($n=110$)	Satisfied ($n=27$)	Realistic ($n=56$)	Dissatisfied ($n=27$)	Total ($n=110$)
Somatization	0.058	0.269*	0.193	0.106	−0.263	0.302*	−0.022	0.076
Obsessive–compulsive	−0.005	0.405**	−0.072	0.114	−0.353	0.083	0.012	−0.018
Interpersonal sensitivity	0.164	0.325**	0.289	0.156	−0.430*	0.051	0.073	−0.021
Depression	−0.007	0.341*	0.289	0.126	−0.228	0.091	−0.077	−0.003
Anxiety	0.189	0.402**	0.307	0.214*	−0.373	0.254	−0.080	0.062
Hostility	0.354	0.465***	0.196	0.234*	−0.367	0.014	−0.003	−0.026
Phobic anxiety	0.272	0.208	0.160	0.090	−0.293	0.378**	−0.040	0.122
Paranoia	0.147	0.385**	0.255	0.206*	−0.354	−0.004	0.005	−0.040
Psychoticism	0.311	0.391**	0.368	0.260**	−0.447*	0.109	0.055	−0.004

*$p<0.05$, **$p<0.01$, ***$p<0.001$.

Table 4
Differences among the Satisfied, Realistic and Dissatisfied subgroups in correlations between side effects, general functioning and QOL.

	Manchester Side effects			
	Satisfied ($n=27$)	Realistic ($n=56$)	Dissatisfied ($n=27$)	Total ($n=110$)
GAF	−0.159	−0.448**	−0.301	−0.226*
LSRS				
Relationships with family	−0.185	−0.140	−0.137	−0.192*
Sense of self and life	−0.137	−0.363**	0.013	−0.279**
Friends and interpersonal relations	−0.250	−0.275*	0.129	−0.236*
Residential environment	−0.264	−0.328*	−0.296	−0.333***
Physical and mental health	−0.127	−0.519***	−0.409*	−0.419***
Clothing–eating-economic conditions	−0.024	−0.388**	0.189	−0.126
Leisure activities	−0.177	−0.381**	−0.205	−0.323**
Occupation and daily activities	−0.355	−0.303*	−0.181	−0.318**
Total	−0.338	−0.460***	−0.149	−0.379***

*$p<0.05$, **$p<0.01$, ***$p<0.001$.
GAF: Global Assessment of Functioning; LSRS: Life Satisfaction Rating Scale.

complain of somatization, interpersonal sensitivity, depression, and phobic anxiety symptoms compared to other patients, despite a lack of any apparent difference in positive or negative symptoms. Hence, for this subgroup, treatment strategies to improve affective symptoms and coping responses are likely to result in an improvement in their quality of life and better adherence.

A significant portion of subjective QOL is explained by subjective distress induced by side effects such as akathisia, neuroleptic dysphoria (Dernovsek et al., 2001) and extrapyramidal symptoms (Strejilevich et al., 2005). The results of the present study also confirm that side effects are significantly correlated with both the clinician-rated level of general functioning and the self-rated QOL. Nonetheless, some researchers have found substantial disagreement between patients' and psychiatrists' rating of the "troublesomeness" of particular side effects (Strejilevich et al., 2005; Day et al., 1998). Our results suggest that such a negative impact of side effects on one's functioning may be more realistically assessed by the Realistic subgroup, who showed significant associations between side effects and all but the *relationship with family* domain of QOL. As for the Satisfied subgroup, who showed no associations between side effects and QOL, the negative consequences of side effects in most life satisfaction domains are likely to have been ignored or downplayed. Hence, side effects may not prove to be a strong predictor of life satisfaction for these patients, and they may tend to report significantly less side effects than the other subgroups. As for the Dissatisfied subgroup, side effects are significantly associated with only the *physical and mental health* domain of life satisfaction, hence rather than side effects, the level of self-reported psychopathology is likely to be a better predictor of QOL.

Consistent with the above discussion, one would expect that the subgroups would also vary in their levels of insight, although we did not use any direct measures of insight in our study to test for this. As insight has been defined as awareness of not only the presence of illness but also its implications (Lincoln et al., 2007), the Realistic subgroup is likely to have the highest level of insight, while the Satisfied subgroup is likely to have the most impaired insight because positive symptoms have been found to be associated with a lack of insight. Hence, for patients who show high levels of life satisfaction despite poor functioning, caution should be taken by clinicians in interpreting various self-report measures. As for the Dissatisfied subgroup, lower levels of physical health, vitality, psychosocial, affective and general QOL have also been reported by patients with good insight in a recent study by Karow et al. (2008), suggesting that they are likely to be aware of their illness but have more difficulty in overall psychosocial functioning. Future studies should therefore include insight to examine how the subgroups vary in their levels of insight and how it relates to the correspondence between self- and clinician-rated measures of QOL and psychopathology.

In our study, no significant differences among the subgroups in the demographic variables were found except that there were significantly more inpatients than outpatients included in the Satisfied subgroup. In addition, in a separate analysis, we did not find any significant difference in LSRS total scores between the inpatients and outpatients in the total sample. This may be because, as Eack and Newhill (2007) suggested, psychiatric symptoms may have less impact on patients living in psychiatric hospital units, where active psychotic symptoms are expected, because most of these units are secure settings and often less disruptive to the patients' ability to meet their needs. When we examined the differences between the inpatients and outpatients of the Realistic subgroup, however, the inpatients had significantly lower scores for both GAF ($t=-2.40$, $p<.05$) and total LSRS ($t=-2.88$, $p<.01$) compared to the outpatients. Our results therefore support the notion that the subjective evaluation of QOL in schizophrenia may be affected by both symptom profile (Bebbington et al., 2009) and treatment setting (Eack et al., 2007; Kasckow et al., 2001; Kaiser et al., 1997; Browne et al., 1996), and that diagnostically homogeneous sampling should be considered in studying subjective QOL (Kaiser et al., 1997).

Taken together, although selection of the assessment instruments is an important issue in evaluating QOL in patients with schizophrenia (Burlingame et al., 2005), heterogeneity in the sample should be one of the foremost considerations before designing a study involving patients with schizophrenia. In light of the inconsistencies of associations found in past studies between self-reported and clinician-rated measures of QOL and psychopathology, weighing the possibility of such heterogeneity in the sample by applying reasonable methods to stratify the patients seems to be a practical approach for elucidating the underlying relationships between the interrelated variables.

Lastly, though our application of a descriptive measure of correspondence index proved to be effective in demonstrating the heterogeneity of the sample and highlighting the differences among the stratified subgroups, this approach did have limitations that should be addressed. For one, the measures with which we derived our CI, i.e., the GAF and LSRS scores, may not be completely independent from the measures of psychopathology, as the same investigator rated both GAF and MS, and the patients also completed the SCL-90-R and the LSRS at the same time. In addition, there may be some overlap between the GAF and the MS, since the scoring of the GAF does partly take into account the severity of symptoms. Moreover, some of the items constituting the negative symptoms of the MS were rated based on self-report, which may have contributed to a small number of significant correlations between negative symptoms and the SCL-90-R subscales. In order to confirm the generalizability of the results, future studies should therefore be designed with independent raters for separate objective measures and include other measures of psychopathology as well as self-reported side effects. Another issue to be considered is our small sample size, which may have contributed to the weak associations found in the discordant subgroups and also precluded us from conducting separate analyses for male and female patients. Although the majority of significant associations found in the Realistic subgroup in our study had p-values $<.01$, the use of multiple testing in this study may also have contributed to an increased Type-I error. Future studies should therefore be carried out with larger subgroups matched in size to not only confirm our results but also to examine possible confounding effects of gender differences on side effects and QOL, as females have been found to show more affective symptoms (Leung and Chue, 2003) and side effects, such as tardive dyskinesia (Yassa

and Jeste, 1992) and hyperprolactinemia (Aichhorn et al., 2005). Lastly, our study used the LSRS total score as a self-report measure of QOL comparable to the clinician-rated GAF, whose reliability of self-report version has only recently been demonstrated (Ramirez et al., 2008). Hence, future studies aiming to further explore the issue of the correspondence between subjective and objective measures should consider applying more equivalent forms as well as quantitative measures of QOL.

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