

REVIEW

Quality of life and its predictors in people with schizophrenia

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Abstract : The author reviewed measurement of quality of life (QOL) of schizophrenia patients and the clinical factors related to their QOL. As schizophrenia patients were thought to be unable to assess their own QOL because of their cognitive impairment, objective QOL measures had been frequently used. However, nowadays, there is general agreement that symptomatically stabilized patients could assess their QOL by themselves. Therefore, researchers gradually have become interested in subjective QOL measure. Although most researchers often evaluate schizophrenia patients' QOL using only subjective or objective QOL measure, considering the fact that there is a discrepancy between the two types of measures, it is recommended to use both of them as complementary measures. As for clinical factors related to lowered QOL, several studies reported that depressive symptom was most associated with lowered subjective QOL, negative symptom was strongly related to lowered objective one and poor life skill was associated with both. Moreover, several studies found that cognitive dysfunctions in some cognitive domains were related to lowered objective QOL but the effects of them were much smaller than those of negative symptoms. It is suggested that improving depressive and negative symptoms and life skills may contribute to enhancement of QOL of schizophrenia patients. *J. Med. Invest.* 58 : 167-174, August, 2011

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INTRODUCTION

Schizophrenia is a disease that can devastate the lives of people who suffer from it, and people with it suffer distress, disability, reduced productivity, and lowered quality of life (QOL). Over the past two decades, the concept of QOL has become an important attribute in patient care and research in psychiatry area (1-3).

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Although there seems to be no unanimous definition of QOL at the moment, there is general agreement that QOL consists of access to resources and opportunities, fulfillment of life's roles, level of functioning and a sense of well being or life satisfaction (4, 5). As QOL is today regarded one of the most important outcome measures, it is important to clarify the clinical factors associated with lowered QOL. Doing so can lead to more sophisticated treatment strategies.

In this article, the author reviewed some existing articles on measurement of QOL of schizophrenia patients and clinical factors associated with QOL.

MEASUREMENT OF QUALITY OF LIFE

Recently, there has been increasing interest in QOL of people with schizophrenia, and now, QOL measures are included routinely in most studies of intervention or outcome (5, 6). However, not a few problems have been identified with the implement of the instruments. Such problems include the definition of the concept of QOL and the approach for measurement of it. Although there is no unanimous definition of QOL, the World Health Organization defines QOL as individuals' perception of their position in life in the context of culture and value systems in which they live and in relation to their goals, expectations, standards, and concerns (7).

QOL of people with schizophrenia has been measured from two different viewpoints. One is a self-rated measurement of QOL (subjective QOL) and the other is an interviewer-rated measurement of QOL (objective QOL). Although, according the definition by the World Health Organization, individuals' perception of QOL seems to be vital, QOL of schizophrenia patients had been frequently assessed with objective QOL measures. Because of schizophrenia patients' cognitive impairment, they had been thought to be unable to evaluate their own QOL by themselves. However, nowadays, there is general agreement that stabilized schizophrenia patients could assess their QOL by themselves (8).

Objective measures of QOL usually include indicators of health and living conditions, sociodemographic items and role functioning in society, whereas subjective measures of QOL do indicators of life satisfaction in general and within different life domains (5). For example, the Quality of Life Scale (QLS) (9), one of the most frequently used objective QOL measures, was specifically constructed to measure QOL of people with schizophrenia. The QLS is a 21-item scale from a semistructured interview providing information on symptoms and functioning during the preceding 4 weeks. The QLS has four subscales, Intrapsychic foundations, Interpersonal relations, Instrumental role, and Common objects and activities. Intrapsychic foundations subscale items elicit judgments about intrapsychic elements in the dimensions of cognition, conation, and affectivity seen as near the core deficit of schizophrenia. Interpersonal relations subscale relates to various aspects of interpersonal and social experience. Instrumental role subscale focuses on the role of worker, student, or housekeeper/parent. Common objects and activities subscale is based on the assumption

that a robust participation in the community is reflected in the possession of common objects and the engagement in regular activities (9).

As for subjective QOL instruments, although not a few subjective QOL instruments exist to assess health-related QOL, it is said that they can sometimes overlook the QOL concerns of specific patients groups. Recently, Wilkison *et al.* (10) constructed schizophrenia disease specific subjective QOL instrument that is called the Schizophrenia Quality of Life Scale (SQLS). The SQLS consists of three scales that are Psychosocial, Motivation and energy, and Symptoms and side-effect. Lower scores indicate higher QOL. The Japanese version of it is often used in studies in Japan (11).

RELATION BETWEEN SUBJECTIVE AND OBJECTIVE QUALITY OF LIFE MEASURES

Researchers have been paying attention to the relation between subjective and objective QOL measures. Although many studies used only one of them, if they reflect different aspects of QOL and have different predictors, doing so is likely to introduce bias in the results. However, there are only a few studies investigating the relation between them.

Using the Quality of Life Interview which contains subjective and objective measures, Dickerson *et al.* (12) studied 72 outpatients with schizophrenia and demonstrated that there were few significant correlations between subjective and objective QOL indicators of specific life areas. Fitzgerald *et al.* (5) found that life satisfaction and objectively rated QOL are not closely related, and concluded that subjective and objective QOL had different determinants in patients with schizophrenia.

To explore the relationship between subjective and objective QOL measures, we conducted a strict research using schizophrenia disease specific subjective and objective QOL measures (13). In the cross-sectional study, 99 symptomatically stabilized outpatients with a DSM-IV diagnosis of schizophrenia were assessed with the SQLS (10, 11) and the QLS (9). The correlations between the scores on scales of the SQLS and the QLS total and subscales in the study are shown in Table 1. The score of the Motivation and energy scale correlated significantly with the QLS total score, Interpersonal relations, Instrumental role, Intrapsychic foundations, and Common Objects and activities subscales. Moreover, the score of the Psychosocial scale showed a

Table 1 Correlation between Schizophrenia Quality of Life Scale and Quality of Life Scale (N=99) (from Ref.13 Tomotake M, *et al.* Psychol Rep 99, 477-487, 2006)

		SQLS		
		Psychosocial	Motivation and energy	Symptoms and side- effects
QLS	Total	-.20 *	-.40 ***	-.16
	Interpersonal relations	-.19	-.42 ***	-.16
	Instrumental role	-.19	-.28 **	-.14
	Intrapsychic foundations	-.19	-.39 ***	-.14
	Common objects and activities	-.10	-.25 *	-.14

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

SQLS=Schizophrenia Quality of Life Scale, QLS=Quality of Life Scale.

significant but weak correlation with the QLS total score. The score of the Symptoms and side-effects scale did not correlate significantly with the QLS scores.

Considering these results indicating that there were only a few significant correlations between the SQLS and the QLS scores, researchers should use both of subjective and objective QOL measures as complementary outcome measures in order to avoid introducing bias.

RELATION BETWEEN CLINICAL SYMPTOMS AND QUALITY OF LIFE

As for the clinical symptoms associated with subjective QOL, Dickerson *et al.* (1998) found that schizophrenia patients' subjective QOL measured by the Quality of Life Interview was significantly related to the depression factor in the Positive and Negative Syndrome Scale (PANSS). Huppert *et al.* (14) also found that more severe depression as rated on the Brief Psychiatric Rating Scale (BPRS) was associated with lower subjective QOL measured by the Quality of Life Interview. Other similar studies support the significant association of depressive symptom with subjective QOL (5, 15). As for subjective well-being which is the main component of subjective QOL, Norman *et al.* (16) reported that the General Well-Being Scale score was significantly related to positive symptom, particularly reality distortion. These results suggest that depressive and positive symptoms may be important factors influencing schizophrenia patients' subjective QOL. Moreover, other clinical factors such as anxiety, extrapyramidal adverse effects, and patients' subjective responses and attitudes towards antipsychotic treatment have been found to be significantly associated with subjective QOL (1, 14, 15).

Clinical factors related to objective QOL also have been investigated, and several research groups reported that negative symptom was much more closely related to objective QOL than was positive symptom (5, 16). As the studies used the QLS which was originally designed to assess deficit symptoms of schizophrenia, it may stand to reason that fewer negative symptoms were associated with better QOL assessed by the QLS. However, some studies showed the significant associations of positive symptom and other clinical factors with the QLS (17-20).

We investigated the relationship between several clinical factors (duration of illness, number of hospitalization, dose of neuroleptics, positive symptom, negative symptom, extrapyramidal symptom, and depressive symptom) and QOL in outpatients with schizophrenia (13). The results of stepwise regression analyses on the SQLS and the QLS in the study are shown in Table 2. Psychosocial scale score was predicted independently by the Calgary Depression Scale for Schizophrenia (CDSS) score, the BPRS positive symptoms score, dose of neuroleptics, and the BPRS negative symptoms score. The CDSS score contributed significantly to the prediction of the Motivation and energy scale score. Symptoms and side-effects scale score was predicted independently by the BPRS positive symptoms score, the CDSS score, and dose of neuroleptics. The QLS total score was predicted independently by the BPRS negative symptoms score and the BPRS positive symptoms score. The BPRS negative symptoms score and duration of illness contributed independently to the prediction of the Interpersonal relations subscale. Instrumental role subscale was predicted independently by the BPRS negative symptoms score and the BPRS positive symptoms score. The Intrapsychic foundations subscale was also predicted by the BPRS negative symptoms score and the

Table 2 Summary of stepwise regression analyses on Schizophrenia Quality of Life Scale and Quality of Life Scale (N=99) (from Ref.13 Tomotake M, *et al.* Psychol Rep 99, 477-487, 2006)

Dependent variables		Independent variables	Adjusted R ²	β	
SQLS	Psychosocial	CDSS	.48***	.58***	
		BPRS positive symptoms		.42***	
		Dose of neuroleptics		-.22**	
		BPRS negative Symptoms		-.18*	
	Motivation and energy	CDSS	.23***	.48***	
	Symptoms and side-effects	BPRS positive symptoms	.21***	.37**	
		CDSS		.27**	
		Dose of neuroleptics		-.20*	
	QLS	Total	BPRS negative symptoms	.46***	-.53***
			BPRS positive symptoms		-.24**
		Interpersonal relations	BPRS negative symptoms	.36***	-.60***
			Duration of illness		-.21*
Instrumental role		BPRS negative symptoms	.28***	-.33**	
		BPRS positive symptoms		-.31**	
Intrapsychic foundations		BPRS negative symptoms	.53***	-.59***	
		BPRS positive symptoms		-.24**	
Common objects and activities		BPRS negative symptoms	.33***	-.58***	
		Duration of illness		-.19*	

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

SQLS=Schizophrenia Quality of Life Scale, QLS=Quality of Life Scale, CDSS=Calgary Depression Scale for Schizophrenia, BPRS= Brief Psychiatric Rating Scale.

BPRS positive symptoms score. The BPRS negative symptoms score and duration of illness contributed independently to the prediction of the Common objects and activities subscale.

In general, these findings seem to indicate that depressive symptom is the most important predictor of subjective QOL and negative symptom is the most important one of objective QOL.

RELATION BETWEEN LIFE SKILLS AND QUALITY OF LIFE

There are a few studies that investigated the relationship between life skill and QOL in people with schizophrenia. Norman *et al.* (16) reported the significant relationships among life skill, subjective QOL and objective QOL in subjects with schizophrenia or schizoaffective disorder. On the other hand,

Parker *et al.* (21) reported no significant correlation between life skill and subjective QOL.

Recently, Aki *et al.* (22) investigated the relation between life skills and QOL in schizophrenia patients. In the study, they used the Life Skills Profile (LSP) to evaluate life skills of patients with schizophrenia, and subjective QOL and objective QOL were assessed the SQLS and the QLS, respectively. The LSP was designed by Rosen *et al.* (23) to assess survival and adaptation in the community by individuals with severe mental illness. The LSP is a thirty nine-item questionnaire. Each item is rated from 1 to 4 and a higher score indicates a greater level of life skills. The LSP has five subscales that are Self-care, Non-turbulance, Socialization, Communication, and Responsibility. Table 3 shows the results of correlation analyses between the SQLS, the QLS and the LSP in the study. The LSP total score correlated with scores of the SQLS and the

Table 3 Correlation among Schizophrenia Quality of Life Scale, Quality of Life Scale and Life Skills Profile (N=64) (from Ref.22 Aki H, *et al.* Psychiatry Res 158, 19-25, 2008)

	SQLS			QLS				
	Psychosocial	Motivation and energy	Symptoms and side-effects	Total	Interpersonal relations	Instrumental role	Intrapsychic foundation	Common objects and activities
LSP								
Total	-0.47**	-0.41*	-0.46**	0.55**	0.48**	0.56**	0.49**	0.47**
Self-care	-0.40*	-0.32	-0.43**	0.52**	0.46**	0.54**	0.45**	0.49**
Non-turbulence	-0.44**	-0.25	-0.43**	0.16	0.08	0.24	0.17	0.13
Socialization	-0.36	-0.44**	-0.28	0.63**	0.57**	0.57**	0.57**	0.50**
Communication	-0.33	-0.31	-0.37*	0.37	0.32	0.39*	0.33	0.27
Responsibility	-0.24	-0.17	-0.25	0.26	0.22	0.29	0.23	0.26

*p< 0.05, **p<0.01 (Bonferroni correction).

SQLS=Schizophrenia Quality of Life Scale, QLS=Quality of Life Scale, LSP=Life Skills Profile.

QLS, which seems to indicate that basic life skills have some effects on schizophrenia patients' QOL. Especially, life skills about self-care and socialization are important factors.

From the findings, it is suggested that improving life skills may lead to enhancement of schizophrenia patients' QOL. However, a prospective research will be needed to clarify this.

RELATION BETWEEN COGNITIVE FUNCTION AND QUALITY OF LIFE

Cognitive problems have been considered a core component of schizophrenia. However, they have only recently been considered as potential treatment targets (24). Recently, it has become apparent that there are several aspects of impaired neurocognition that are consistently found in schizophrenia. Such cognitive dysfunctions are paid much more attention because they are thought to lead to poor social functioning.

Some research groups reported that functional magnetic resonance imaging (fMRI), positron emission tomography (PET), and electroencephalogram (EEG) show relations between neuroanatomical measures and cognitive deficits in schizophrenia patients, and these relations are particularly found in frontal regions, temporal cortex, and hippocampus (24). And it has been reported that cognitive functions of schizophrenia patients were of the order of one to two standard deviations below the mean of healthy controls in several cognitive dimensions, particularly memory, attention, verbal fluency, and executive function (25-28).

These cognitive dysfunctions are thought to be associated with lowered social activity, poor acquisition of social skills during the rehabilitation programme, and lowered QOL. Some previous research groups have investigated the relation between QOL and cognitive function in people with schizophrenia, and reported the significant correlations between QOL and some domains of cognitive function such as verbal memory, vocabulary, fluency performance, attention, social knowledge, and executive function (12, 28, 29-32).

From the results of previous studies, it seems to be clear that cognitive dysfunctions and some clinical symptoms are significantly correlated with lowered QOL in schizophrenia patients. However, it remains unclear how much impact these factors have on their QOL. Some studies demonstrated that cognitive dysfunction had a greater influence on schizophrenia patients' QOL than positive symptoms (33-35). On the other hand, some reported that neuropsychological function had a little impact on their QOL in the presence of some clinical symptoms (32, 36). The discrepancy among these studies might have been caused by differences of sample population, cognitive tests, and QOL scales (32-34, 36).

To elucidate the relation between cognitive function and QOL in schizophrenia patients, Yamauchi *et al.* (37) investigated the relations between the SQLS, the QLS, and the PANSS cognitive factor in 84 outpatients with schizophrenia. The results showed that although the PANSS cognitive factor was significantly correlated with both of the SQLS and the QLS, it seemed to have a greater influence on the QLS score than the SQLS score.

Recently, our research group (38) conducted a

strict study to elucidate the relation between cognitive function and QOL by using the Brief Assessment of Cognition in Schizophrenia (BACS) (39, 40) that is a newly developed neuropsychological battery for assessing cognitive function of schizophrenia patient. The BACS has been developed for clinical trials with a brief battery of tests for measuring cognition. It assesses the aspects of cognition that were found to be most impaired and most strongly correlated with outcome in patients with schizophrenia. The domains of cognitive function evaluated by the BACS are Verbal memory (List learning), Working memory (Digit sequencing task), Motor speed (Token motor task), Verbal fluency (Category instances and Controlled oral word association test), Attention and speed of information processing (Symbol coding), and Executive function (Tower of London) (39).

In our study (40), Z-score for Verbal memory was -1.68 (SD=1.28), that for Working memory -1.23 (SD=1.78), that for Motor speed -1.81 (SD=1.64), that for Attention and speed of information processing -1.66 (SD=1.19), that for Verbal fluency -0.82 (SD=1.11), and that for Executive function -1.20 (SD=1.95), showing that cognitive performance of schizophrenia patients were much disturbed than healthy controls. The correlations between the QLS scores and the BACS scores are shown in Table 4. The BACS Composite score, Attention and speed of information processing score, and Verbal memory score showed significant and positive correlations with the QLS total and all or some subscale scores. In the study, stepwise regression analyses when using several clinical variables including the BACS scores as independent variables showed that

the QLS total score was significantly predicted by the PANSS negative syndrome scale score, the CDSS score, and the BACS Attention and speed of information processing score. The results were rather consistent with those of previous researches in terms of that cognitive dysfunction was on the whole related to lowered objective QOL (28, 30, 37).

In addition, we also investigated the relation between subjective QOL and cognitive function and reported that there was no significant correlation between them (41).

CONCLUSIONS

Subjective and objective QOL measures have different predictors in people with schizophrenia. Depressive symptom is most related to subjective QOL, negative symptom is most associated with objective one, and basic life skills are related to both. Cognitive dysfunctions in some neurocognitive domains are associated with lowered objective QOL, but the effects of them are much smaller than negative and depressive symptoms. It is suggested that improving depressive and negative symptoms and basic life skills may contribute to enhancement of QOL of schizophrenia patients.

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Table 4 Correlation between Quality of Life Scale and Brief Assessment of Cognition in Schizophrenia (N=61) (from Ref.38 Ueoka Y, *et al.* *Prog Neuropsychopharmacol Biol Psychiatry* 35, 53-59, 2011)

	QLS				
	Total	Interpersonal relations	Instrumental role	Intrapsychic foundation	Common objects and activities
BACS					
Verbal memory	0.419**	0.415**	0.311	0.422**	0.295
Working memory	0.281	0.283	0.142	0.290	0.259
Motor speed	0.196	0.175	0.126	0.222	0.228
Attention and speed of information processing	0.515**	0.495**	0.372*	0.541**	0.418**
Verbal fluency	0.203	0.200	0.154	0.206	0.170
Executive function	0.168	0.174	0.103	0.131	0.175
Composite score	0.341*	0.346*	0.205	0.341*	0.305

*p< 0.05, **p< 0.01 (Bonferroni correction).

BACS= Brief Assessment of Cognition in Schizophrenia, QLS= Quality of Life Scale.

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