

ORIGINAL**Relationship between quality of life and clinical factors in inpatients with schizophrenia**Yoshimune Ishii¹, Masahito Tomotake², Shinichi Chiba², Rie Tsutsumi², Masatomo Aono¹, and Koushirou Taguchi¹¹Department of psychiatry, Jounan Hospital, Tokushima, Japan, ²Department of Mental Health, Institute of Biomedical Sciences, Tokushima University Graduate School, Tokushima, Japan

Abstract : **Objective :** The purpose of this study was to clarify the relationship between quality of life (QOL) and clinical factors in inpatients with schizophrenia. **Methods :** Subjects were 50 hospitalized patients with schizophrenia. Their mean age was 56.48 (Standard Deviation=11.93) years. Japanese version of the schizophrenia Quality of Life Scale (JSQLS) and Subjective Well-being under Neuroleptic drug Treatment Short form, Japanese version (SWNS-J) were used to assess subjective QOL, and Mini Mental State Examination-Japanese was used to evaluate cognitive function. Japanese version of the Calgary Depression Scale for Schizophrenia (JCDSS), Brief Psychiatric Rating Scale, and Drug-Induced Extrapyramidal Symptoms Scale were used to assess depression severity, psychotic symptoms, and drug-induced extrapyramidal symptoms, respectively. Stepwise regression analyses were conducted to find factors influencing JSQLS and SWNS-J. **Results :** JCDSS was a predictor of two scales of JSQLS, and JCDSS also predicted SWNS-J Total and its two subscales. However, other clinical factors were not related to JSQLS and SWNS-J. **Conclusion :** The results indicate that treating depressive symptoms may lead to improvement of subjective QOL in inpatients with schizophrenia. *J. Med. Invest.* 69:80-85, February, 2022

Keywords : schizophrenia, inpatient, quality of life, depressive symptom, cognitive function

INTRODUCTION

The goal of conventional treatment of schizophrenia has been to improve the psychotic symptoms (1). However, people gradually started to know that it would be sometimes difficult to achieve the goal (2). For example, increasing dose of antipsychotic drugs or using them for a long time to improve psychotic symptoms may cause various side effects such as acute dystonia, akathisia, parkinsonism, tardive dyskinesia, and hyperprolactinemia, which may adversely affect functional status of patients (2, 3). Therefore, therapists need to consider patient's subjective well-being or quality of function in daily life as well as symptom reduction in the treatment of schizophrenia.

Since the 1980s, research and development of QOL assessment tools have been active (4, 5) and new assessment tools have been made for patients with schizophrenia (4-6). The usefulness of the concept of QOL as a framework for integrating information related to evaluation of services has been investigated (7, 8), and the concept of QOL has gradually expanded from an indicator focused on specific symptoms or diseases to a concept related to treatment outcome. However, because of a variety of scales for QOL evaluation, research results have been inconsistent (4). There are investigations reporting that there is a slight correlation between objective QOL assessed by medical professionals and subjective QOL assessed by patients themselves (8), but there are also reports showing that there is no correlation between them (6, 9, 10). These findings show that it is difficult to assess QOL appropriately (4). Objective QOL reflects function and lifestyle, and it can be used to address service programs more directly, but it is pointed out that it does not consider how

patients feel about their lives and patients' opinions (7). Therefore, recently, subjective QOL has been considered more important because it reflects the patients' satisfaction with treatment, perceived symptoms, and perceived health conditions (6).

Currently, treatment of patients with schizophrenia is shifting from a hospital-based approach to a community-based approach (11), and the goal of treatment is not only to improve patients' symptoms but also to improve their QOL in social life from the perspective of enabling them to lead a psychologically and socially healthy daily life even if psychotic symptoms do not disappear completely (11, 12). Therefore, it is crucial to take patients' subjective QOL into consideration when they are receiving inpatient treatment.

The purpose of this study is to clarify the relationship between QOL and clinical factors in inpatients with schizophrenia.

METHODS*Participants*

Fifty inpatients with schizophrenia diagnosis according to the DSM-V (13) who were receiving inpatient treatment in department of psychiatry of Hospital A participated in this study. All participants gave written consent. Patients with organic brain diseases, epilepsy, and serious physical diseases were excluded when recruiting subjects for this study. Data were collected from November 1, 2018 to January 31, 2019.

Instruments

The following reliable and validated rating scales were used in this study.

Japanese version of the Schizophrenia Quality of Life Scale (JSQLS) (14-16)

The JSQLS is a self-report questionnaire that assesses cognition and interest of patients with schizophrenia. It consists of 30 questions and has three scales of Psychosocial (PS),

Received for publication November 17, 2021 ; accepted December 10, 2021.

Address correspondence and reprint requests to Yoshimune Ishii, Department of psychiatry, Jounan Hospital, 27-1, yukimasa jourokuchou, Tokushima 771-4261, Japan and Fax : +81-88-645-0061.

Motivation/Energy (ME), and Symptoms/Side effects (SS). It calculates score for each domain by scoring each item on a scale of 0 to 4 (0; never, 1; rarely, 2; sometimes, 3; often, 4; always), and lower score indicates better QOL. It is reported that the JSQLS has sufficient reliability and validity (16).

Subjective Well-being under Neuroleptic drug treatment Short form, Japanese version (SWNS-J) (17-19)

The SWNS-J is a self-report questionnaire consisting of 20 question items. It has five subscales: Mental Functioning (MF), Self-Control (SC), Emotional Regulation (ER), Physical Functioning (PF), and Social Integration (SI). Each item is rated on a 6-point scale. Higher score indicates better subjective well-being. It is reported that the SWNS-J has sufficient reliability and validity (19).

Mini Mental State Examination-Japanese (MMSE-J) (20-24)

The MMSE-J evaluates the following abilities: time awareness, place awareness, memorization, attention and calculation, replay, calling, recitation, comprehension, reading, writing, and drawing. When all responses are correct, the total score is 30 points (22, 23). Higher score shows better cognitive function. It is reported that the MMSE-J has sufficient reliability and validity (22, 23).

Japanese version of the Calgary Depression Scale for Schizophrenia (JCDSS) (25-27)

The JCDSS is a semi-structured interview instrument designed to assess severity of depression in patients with schizophrenia. It consists of eight question items and one observation item. Each item is scored on a scale of 0 to 3, and higher score indicates severer depression level (25, 26). The JCDSS has sufficient reliability and validity (27).

Brief Psychiatric Rating Scale (BPRS) (28-31)

The BPRS is widely used in research and clinical scene as an assessment scale of psychiatric symptoms. In this study, we used positive symptom subscale to assess suspiciousness, hallucinatory behavior, conceptual disorganization, and unusual thought content, and negative symptom subscale to assess emotional withdrawal, motor retardation, blunted affect, and disorientation (32, 33). Higher score means severer psychotic symptoms (28-31). The BPRS has sufficient reliability (31).

Drug-induced Extrapyramidal Symptoms Scale (DIEPSS) (34, 35)

The DIEPSS is a scale for evaluation of drug-induced extrapyramidal symptoms and consists of eight individual items and one summary item. It is rated on a 5-point scale from 0 to 4. In this study, we used total score of the eight individual items (34, 35). Higher score indicates severer drug-induced extrapyramidal symptoms (34, 35). It is reported that the DIEPSS has sufficient reliability and validity (34, 35).

Data analysis

SPSS for Windows Ver.24 was used for statistical analysis. Shapiro-Wilk test was used to test for normality of the data. Since normality was not found for the scores of SWNS-J SI, MMSE-J, JCDSS, BPRS positive symptom subscale, and DIEPSS, Spearman's rank correlation coefficient was used for correlation analysis. False discovery rate correction was done to correct significance probability. Stepwise regression analyses were performed using the scores of JSQLS and SWNS-J as dependent variables and the variables showed significant correlations with JSQLS or SWNS-J as independent variables.

Ethical considerations

This study was conducted with the approval of the Clinical Research Ethics Review Committee of Tokushima University Hospital (No.3280) and the Ethical Review Committee of Hospital A.

RESULTS

Table 1 shows demographic characteristics of subjects and results of Shapiro-Wilk test. Correlations between JSQLS and other clinical variables are shown in Table 2. Significant correlations were found between JSQLS PS and MMSE-J ($\rho = -0.382$, $p < 0.01$), between JSQLS PS and JCDSS ($\rho = 0.571$, $p < 0.01$), between JSQLS ME and JCDSS ($\rho = 0.470$, $p < 0.01$), and between JSQLS ME and BPRS negative symptom subscale ($\rho = 0.352$, $p < 0.05$).

Table 3 shows correlations between SWNS-J and other clinical variables. There were significant correlations between SWNS-J Total and JCDSS ($\rho = -0.418$, $p < 0.01$), between SWNS-J MF and MMSE-J ($\rho = 0.330$, $p < 0.05$), between SWNS-J MF and JCDSS ($\rho = -0.458$, $p < 0.01$), and between SWNS-J PF and JCDSS ($\rho = -0.405$, $p < 0.01$).

Results of stepwise regression analyses on JSQLS and SWNS-J are shown in Table 4 and Table 5, respectively. JCDSS significantly predicted JSQLS PS (Adjusted $R^2 = 0.249$, $\beta = 0.514$), JSQLS ME (Adjusted $R^2 = 0.276$, $\beta = 0.539$), SWNS-J Total (Adjusted $R^2 = 0.149$, $\beta = -0.407$), SWNS-J MF (Adjusted $R^2 = 0.212$, $\beta = -0.478$), and SWNS-J PF (Adjusted $R^2 = 0.174$, $\beta = -0.437$).

DISCUSSION

In this study, we found that depressive symptom affects schizophrenia inpatients' QOL, but no other symptoms such as positive symptom, negative symptom, cognitive dysfunction, and drug-induced extrapyramidal symptom have any significant effect on their QOL. To the best of our knowledge, there has been no study examining clinical factors affecting subjective QOL of inpatients with schizophrenia. So, we discussed our results in comparison with previous studies that examined clinical factors affecting subjective QOL of outpatients with schizophrenia.

Dickerson, *et al.* (36) studied 72 outpatients with schizophrenia and reported that depressive symptom score of the Positive and Negative Syndromes Scale (PANSS) was related to the Global Subjective Quality of Life score, but scores of positive and negative symptoms of the PANSS were not. Fitzgerald, *et al.* (37) conducted a similar study with 174 schizophrenia outpatients and reported that life satisfaction scale was significantly correlated with the Montgomery and Asberg Depression Rating Scale, but there was no significant correlation between it and the PANSS positive and negative symptoms scores, and the Extrapyramidal Side Effects Rating Scale score. Reine, *et al.* (38) investigated the relationship between subjective QOL and depression in 67 outpatients with schizophrenia and found that depressive symptom was more significantly related to subjective QOL than extrapyramidal symptom. Noman, *et al.* (39) performed multivariate analyses using the General Well-Being Scale (GWB), the Scales for the Assessment of Positive Symptoms (SAPS), the Scale for the Assessment of Negative symptoms, and reported that the GWB correlated significantly with the reality distortion score, which is a subset of the SAPS, concluding that subjective well-being was strongly related to positive symptom. Awad, *et al.* (2) reported that severity of psychiatric symptoms, subjective re-

Table 1. Demographic characteristics and results of Shapiro-Wilk test

	Mean (SD)	Median(QD)	p - value
N (men/women)	50 (22/28)		
Age (years)	56.48 (11.93)	58.00 (9.00)	0.300
Age of onset (years)	24.60 (9.79)	22.00 (4.50)	0.000**
Duration of illness (years)	32.08 (14.16)	33.00 (11.50)	0.244
Number of hospitalization	4.44 (2.03)	4.00 (1.00)	0.005**
JSQLS			
JSQLS PS	45.03 (16.26)	44.16 (9.58)	0.121
JSQLS ME	47.30 (14.37)	46.42 (11.16)	0.522
JSQLS SS	34.93 (14.73)	32.81 (6.64)	0.170
SWNS-J			
SWNS-J Total	71.84 (11.92)	71.50 (7.50)	0.700
SWNS-J MF	13.48 (3.61)	13.50 (2.50)	0.431
SWNS-J SC	15.04 (3.04)	15.00 (2.50)	0.517
SWNS-J ER	13.74 (3.30)	14.00 (2.00)	0.771
SWNS-J PF	15.12 (3.25)	15.00 (2.00)	0.125
SWNS-J SI	14.46 (3.21)	14.00 (1.50)	0.023*
MMSE-J	24.20 (4.46)	26.00 (4.00)	0.003**
JCDSS	5.26 (4.75)	5.50 (3.50)	0.000**
BPRS			
BPRS positive symptom	9.64 (3.98)	9.00 (3.50)	0.040*
BPRS negative symptom	9.88 (3.23)	10.00 (2.50)	0.188
DIEPSS	2.70 (2.50)	2.50 (2.00)	0.000**

Note: * $p < 0.05$, ** $p < 0.01$, Shapiro-Wilk test.

Abbreviations: SD, Standard Deviation, QD, Quartile Deviation, JSQLS, Japanese version of the Schizophrenia Quality of Life Scale; JSQLS PS, Psychosocial scale of JSQLS; JSQLS ME, Motivation/Energy scale of JSQLS; JSQLS SS, Symptoms/Side effects scale of JSQLS; SWNS-J, Subjective Well-being under Neuroleptic drug treatment short form, Japanese version; SWNS-J Total, Total score of SWNS-J; SWNS-J MF, Mental Functioning subscale of SWNS-J; SWNS-J SC, Self-Control subscale of SWNS-J; SWNS-J ER, Emotional Regulation subscale of SWNS-J; SWNS-J PF, Physical Functioning subscale of SWNS-J; SWNS-J SI, Social Integration subscale of SWNS-J; MMSE-J, Mini Mental State Examination-Japanese; JCDSS, Japanese version of the Calgary Depression Scale for Schizophrenia; BPRS, Brief Psychiatric Rating Scale; DIEPSS, Drug-induced Extrapyramidal Symptoms Scale.

Table 2. Correlation between JSQLS scores and other clinical variables

	JSQLS		
	JSQLS PS	JSQLS ME	JSQLS SS
MMSE-J	-0.382**	-0.295	-0.130
JCDSS	0.571**	0.470**	0.209
BPRS positive symptom	-0.014	-0.113	0.107
BPRS negative symptom	0.214	0.352*	0.157
DIEPSS	0.222	0.064	0.301

Notes: * $p < 0.05$, ** $p < 0.01$, Spearman rank correlation. (False Discovery Rate correction)

Abbreviations: JSQLS, Japanese version of the Schizophrenia Quality of Life Scale; JSQLS PS, Psychosocial scale of JSQLS; JSQLS ME, Motivation/Energy scale of JSQLS; JSQLS SS, Symptoms/Side effects scale of JSQLS; MMSE-J, Mini Mental State Examination-Japanese; JCDSS, Japanese version of the Calgary Depression Scale for Schizophrenia; BPRS, Brief Psychiatric Rating Scale; DIEPSS, Drug-induced Extrapyramidal Symptoms Scale.

Table 3. Correlation between SWNS-J scores and other clinical variables

	SWNS-J					
	SWNS-J Total	SWNS-J MF	SWNS-J SC	SWNS-J ER	SWNS-J PF	SWNS-J SI
MMSE-J	0.295	0.330*	-0.052	0.147	0.246	0.115
JCDSS	-0.418**	-0.458**	-0.112	-0.215	-0.405**	-0.161
BPRS positive symptom	0.069	0.078	-0.084	0.207	0.001	0.154
BPRS negative symptom	-0.185	-0.206	-0.038	-0.152	-0.021	-0.097
DIEPSS	-0.051	-0.204	0.042	0.010	0.024	0.044

Notes : *p < 0.05, **p < 0.01, Spearman rank correlation. (False Discovery Rate correction)
 Abbreviations : SWNS-J, Subjective Well-being under Neuroleptic drug treatment short form, Japanese version ; SWNS-J Total, Total score of SWNS-J ; SWNS-J MF, Mental Functioning subscale of SWNS-J ; SWNS-J SC, Self-Control subscale of SWNS-J ; SWNS-J ER, Emotional Regulation subscale of SWNS-J ; SWNS-J PF, Physical Functioning subscale of SWNS-J ; SWNS-J SI, Social Integration subscale of SWNS-J ; MMSE-J, Mini Mental State Examination-Japanese ; JCDSS, Japanese version of the Calgary Depression Scale for Schizophrenia ; BPRS, Brief Psychiatric Rating Scale ; DIEPSS, Drug-induced Extrapyrimal Symptoms Scale.

Table 4. Results of Stepwise regression analyses on JSQLS

Dependent variables	Independent variable	Adjusted R ²	β
JSQLS PS	JCDSS	0.249**	0.514**
JSQLS ME	JCDSS	0.276**	0.539**

Notes : **p < 0.01.
 Abbreviations : JSQLS, Japanese version of the Schizophrenia Quality of Life Scale ; JSQLS PS, Psycho-social scale of JSQLS ; JSQLS ME, Motivation/Energy scale of JSQLS ; JCDSS, Japanese version of the Calgary Depression Scale for Schizophrenia.

Table 5. Results of Stepwise regression analyses on SWNS-J

Dependent variables	Independent variable	Adjusted R ²	β
SWNS-J Total	JCDSS	0.149**	-0.407**
SWNS-J MF	JCDSS	0.212**	-0.478**
SWNS-J PF	JCDSS	0.174**	-0.437**

Notes : **p < 0.01.
 Abbreviations : SWNS-J, Subjective Well-being under Neuroleptic drug treatment short form, Japanese version ; SWNS-J Total, Total score of SWNS-J ; SWNS-J MF, Mental Functioning subscale of SWNS-J ; SWNS-J PF, Physical Functioning subscale of SWNS-J ; JCDSS, Japanese version of the Calgary Depression Scale for Schizophrenia.

sponses to antipsychotic drugs, and side effects of antipsychotic drugs were considered as important predictors of QOL. However, Larsen, *et al.* (6) studied the relationship between psychiatric symptoms, medication side effects, and subjective QOL in chronic outpatients with schizophrenia visiting an outpatient clinic and reported that no significant correlation between subjective QOL and mental status, and side effects of drugs.

When summarizing the results of previous studies, we could say that depressive symptom is considered important as a clinical factor affecting the subjective QOL of outpatients with schizophrenia (40). In this study, we focused on inpatients with schizophrenia who had severer positive or negative symptom and higher level of drug-induced extrapyramidal symptom than outpatients. So, we expected that those symptoms would affect their subjective QOL significantly. Moreover, recently, cognitive dysfunction of patients with schizophrenia has been reported to be more important than psychiatric symptoms in terms of affecting daily functioning and interpersonal relationships (41-

43). Therefore, we also expected that cognitive function would affect their subjective QOL. However, the results of this study clearly show that depressive symptom is only clinical factor independently affecting subjective QOL. This may be because subjects of this study had severer depression level than outpatients in the previous study (4). But the results suggest that improvement of depressive symptom may lead to better subjective QOL in the inpatient treatment of schizophrenia.

CONCLUSION

We found a clinical factor influencing subjective QOL of inpatients with schizophrenia. Although inpatients have severer psychiatric symptoms than outpatients, positive and negative symptoms do not affect their QOL significantly, but only depressive symptom significantly influences it. This is a new finding we found in this study, suggesting that focusing on treatment of

depressive symptom may lead to better QOL of inpatients with schizophrenia.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

ACKNOWLEDGEMENTS

We would like to express our deepest gratitude to the patients who participated in this study and the medical staff of Jounan Hospital who supported this study.

REFERENCES

- Revicki DA, Murray M : Assessing health-related quality of life outcomes of drug treatments for psychiatric disorders. *CNS Drugs* 1 : 465-476, 1994
- Awad AG, Voruganti LNP, Heslegrave RJ : A conceptual model of quality of life in schizophrenia : description and preliminary clinical validation. *Quality of Life Research* 6 : 21-26, 1997
- Lally J, MacCabe JH : Antipsychotic medication in schizophrenia : a review. *British Medical Bulletin* 114 : 169-179, 2015
- Tomotake M, Iga J, Kinouchi S, Shibuya S, Motoki I, Sumitani S, Yamauchi K, Kotani Y, Kaneda Y, Taniguchi T, Ishimoto Y, Ueno S, Ohmori T : Subjective and objective quality of life in outpatients with schizophrenia. *Annual Review of Psychopharmacology* 36 : 145-152, 2004 (in Japanese)
- Kunikata H, Mino Y : Quality of life and schizophrenia a review of the literature. *Japan Journal of Public Health* 50 : 377-388, 2003 (in Japanese)
- Larsen EB, Gerlach J : Subjective experience of treatment, side-effects, mental state and quality of life in chronic schizophrenic out-patients treated with depot neuroleptics. *Acta Psychiatrica Scandinavica* 93 : 381-388, 1996
- Lehman AF : The well-being of chronic mental patients. *Arch Gen Psychiatry* 40 : 369-373, 1983
- Lehman AF : A quality of life interview for the chronically mentally ill. *Evaluation and Program Planning* 11 : 51-62, 1998
- Osada H, Tateyama M, Ketsuka T, Satomura K, Matsumoto H, Miyata R, Fujii Y, Noguchi H, Yamanaka K, Tsugeno M : Quality of Life in Schizophrenic Patients (II). *The Journal of Tokyo Academy of Health Sciences* 1 : 107-110, 1998 (in Japanese)
- Tomotake M, Taniguchi T, Kaneda Y, Ishimoto Y, Ohmori T : Effect of atypical antipsychotics on quality of life in patients with schizophrenia. *Annual report of Pharmacopsychiatry research* 35 : 99-105, 2003 (in Japanese)
- Cabinet Office : Annual report on government measures for persons with disabilities. Cabinet Office, Government of Japan, Tokyo, 2018, pp.151-154 (in Japanese)
- Tomita K, Takahashi N, Saito S, Maeno N, Iwamoto K, Yoshida K, Kimura H, Iidaka T, Ozaki N : Relationship of psychopathological symptoms and cognitive function to subjective quality of life in patients with chronic schizophrenia. *Psychiatry and Clinical Neurosciences* 64 : 62-69, 2010
- American Psychiatric Association : The Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-V). American Psychiatric Association, Washington DC, 2013
- Wilkinson G, Hesdon B, Wild D, Cookson R, Farina C, Sharma V, Fitzpatrick R, Jenkinson C : Self-report quality of life measure for people with schizophrenia : The SQLS. *The British Journal of Psychiatry* 177 : 42-46, 2000
- Kaneda Y, Imakura A, Ohmori T : The Japanese version of the Schizophrenia Quality of Life Scale (JSQLS). *Clinical Psychiatry* 46 : 737-739, 2004 (in Japanese)
- Kaneda Y, Imakura A, Fjii A, Ohmori T : Schizophrenia Quality of Life Scale : validation of the Japanese version. *Psychiatry Research* 113 : 107-113, 2002
- Naber D : A self-rating to measure subjective effects of neuroleptic drugs, relationships to objective psychopathology, quality of life, compliance and other clinical variables. *International Clinical Psychopharmacology* 10 : 133-138, 1995
- Naber D, Moritz S, Lambert M, Rajonk F, Holzbach R, Mass R, Andresen B, Frank P, Rüdiger H, Reinhard M, Burghard A : Improvement of schizophrenic patients' subjective well-being under atypical antipsychotic drugs. *Schizophrenia Research* 50 : 79-88, 2001
- Watanabe M, Matsumura H : Reliability and validity of Subjective Well-being under Neuroleptic drug treatment Short form, Japanese version (SWNS-J). *Clinical Psychopharmacology* 6 : 905-912, 2003 (in Japanese)
- Crum RM, Anthony JC, Bassett SS, Folstein MF : Population based norms for the Mini-Mental State Examination by age and educational level. *Journal of the American Medical Association* 269 : 2386-2391, 1993
- Folstein MF, Folstein SE, McHugh PR : "MINI-MENTAL STATE" A practical method for grading the cognitive state of patients for the clinician. *Journal of Psychiatric Research* 12 : 189-198, 1975
- Sugishita M, Hemmi I, Takeuchi T : Reexamination of the validity and reliability of the Japanese version of the Mini-Mental State Examination (MMSE-J). *Japanese Journal of Cognitive Neuroscience* 18 : 168-183, 2016 (in Japanese)
- Sugishita M, Koshizuka Y, Sudo S, Sugishita K, Hemmi I, Karasawa H, Ihara M, Asada T, Mihara B : The validity and reliability of the Japanese version of the Mini-Mental State Examination (MMSE-J) with the original procedure of the attention and calculation task (2001). *Japanese Journal of Cognitive Neuroscience* 20 : 91-110, 2018 (in Japanese)
- Tombaugh TN, McIntyre NJ : The Mini-Mental State Examination : a comprehensive review. *Journal of the American Geriatrics Society* 40 : 922-935, 1992
- Addington D, Addington J, Maticka-Tyndale E : Assessing depression in schizophrenia : the Calgary Depression Scale. *British Journal of Psychiatry* 163 : 39-44, 1993
- Kaneda Y, Ohmori T, Addington D : The Japanese version of the Calgary Depression Scale for Schizophrenia (JCDSS). *Brain and Nerve* 52 : 163-166, 2000 (in Japanese)
- Kaneda Y, Fujii A, Ohmori T : Psychometric properties of the Japanese version of the Calgary Depression Scale for Schizophrenia. *The Journal of Nervous and Mental Disease* 188 : 237-239, 2000
- Overall JE, Gorham DR : The Brief Psychiatric Rating Scale. *Psychological Reports* 10 : 799-812, 1962
- Overall JE, Gorham DR : The Brief Psychiatric Rating Scale (BPRS) : recent developments in ascertainment and scaling. *Psychopharmacology Bulletin* 24 : 97-99, 1988
- Rhoades HN, Overall JE : The semistructured BPRS interview and rating guide. *Psychopharmacology Bulletin* 24 : 101-104, 1988
- Miyata R, Fujii Y, Inagaki A, Inada T, Yagi G : Reliability

- of the Japanese version of Brief Psychiatric Rating Scale (BPRS). *Clinical Evaluation* 23 : 357-367, 1995 (in Japanese)
32. Nicholson IR, Chapman JE, Neufeld RWJ : Variability in BPRS definitions of positive and negative symptoms. *Schizophrenia Research* 17 : 177-185, 1995
 33. Meltzer HY, Burnett S, Bastani B, Ramirez LF : Effects of six months of clozapine treatment on the quality of life of chronic schizophrenic patients. *Hospital & Community Psychiatry* 41 : 892-897, 1990
 34. Inada T : Evaluation and diagnosis of drug-induced extrapyramidal symptoms : commentary on the DIEPSS and guide to its usage. Seiwa Shoten Publishers, Tokyo, 1996 (in Japanese)
 35. Inada T : Guidebook to master the DIEPSS, the revised version of "Evaluation and Diagnosis of Drug-Induced Extrapyramidal Symptoms" : commentary on the DIEPSS and its usage. Seiwa Shoten Publishers, Tokyo, 2012 (in Japanese)
 36. Dickerson FB, Ringel NB, Parente F : Subjective quality of life in out-patients with schizophrenia : clinical and utilization correlates. *Acta Psychiatrica Scandinavica*, 98 : 124-127, 1988
 37. Fitzgerald PB, Williams CL, Corteling N, Filia SL, Brewer K, Adams A, de Castella AR, Rolfe T, Davey P, Kulkarni J : Subject and observer-rated quality of life in schizophrenia. *Acta Psychiatrica Scandinavica*, 103 : 387-392, 2001
 38. Reine G, Lancon C, Di Tucci S, Sapin C, Auquier P : Depression and subjective quality of life in chronic phase schizophrenic patients. *Acta Psychiatrica Scandinavica*, 108 : 297-303, 2003
 39. Norman RMG, Malla AK, McLean T, Voruganti LPN, Cortese L, McIntosh E, Cheng S, Rickwood A : The relationship of symptoms and level of functioning in schizophrenia to general wellbeing and the Quality of Life Scale. *Acta Psychiatrica Scandinavica*, 102 : 303-309, 2000
 40. Ohmori T : Pharmacotherapy for schizophrenia with a view to cognitive function and QOL. *Psychiatria et Neurologia Japonica* 113 : 111-116, 2011 (in Japanese)
 41. Green MF : Cognitive impairment and functional outcome in schizophrenia and bipolar disorder. *Journal of clinical psychiatry* 67 : 3-8, 2006
 42. Green MF : What are the functional consequences of neurocognitive deficits in schizophrenia?. *American Journal of Psychiatry* 153 : 321-330, 1996
 43. Green MF, Kern RS, Braff DL, Mintz J : Neurocognitive deficits and functional outcome in schizophrenia : Are we measuring the "right stuff"? *Schizophrenia Bulletin* 26 : 119-136, 2000