Psychiatry Research 272 (2019) 419–424

Contents lists available at ScienceDirect

Psychiatry Research

journal homepage: www.elsevier.com/locate/psychres

Objective psychosocial function vs. subjective quality-of-life in schizophrenia within 5-years after diagnosis: A study from southern India

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ARTICLE INFO

Keywords:
Schizophrenia
Early course
Subjective quality-of-life
Psychosocial function
Symptoms
Cognition

ABSTRACT

There is increasing interest from treaters and patients alike in subjective quality-of-life (sQOL) and objective psychosocial function as indices of treatment outcome in studies of schizophrenia. With the emergence of evidence-based treatment protocols (e.g., NIMH-funded Recovery after Initial Schizophrenia Episode Initiative) these outcomes are of particular significance in treatment studies of samples early in the course of their illness. Few studies have investigated demographic, clinical and cognitive factors associated with sQOL in samples early in the course of their illness and compared these factors to objective measures. We administered measures of sQOL or satisfaction with life, and objective psychosocial function to 59 people with schizophrenia within 5-years of diagnosis, along with standardized measures of symptoms and cognition. Results revealed that symptoms, rather than cognitive or demographic variables, were the best independent predictors of both subjective QOL and objective functioning. Positive symptoms were independent predictors of sQOL, while positive and negative symptoms were independent predictors of objective psychosocial status. Depression and cognition were also linked to sQOL. These findings point to the importance of attending to residual positive symptoms early in the treatment of schizophrenia as a means of possibly enhancing both subjective and objective outcome in early course schizophrenia.

1. Introduction

Reduction of psychotic symptoms with antipsychotic medications has been a mainstay of psychiatric treatment for schizophrenia for over 50 years. Despite the success of these treatments for attenuating delusions and hallucinations, in more recent years there has been increased interest in developing more comprehensive treatment programs that treat other key illness domains such as disruptions in quality-of-life and psychosocial function in schizophrenia-spectrum illness. These illness domains remain refractory to the effects of even the newest antipsychotic treatments and are increasingly viewed by treaters and people with schizophrenia alike as more meaningful endpoints of treatment than positive symptoms alone. A key first step in developing new therapies for psychosocial function and quality-of-life in schizophrenia is determining illness factors that influence these dimensions of the disorder.

Although no universal definition of psychosocial function and quality-of-life (QOL) exists, most definitions would include ratings of observable indicators, such as number and quality of social relationships, engagement with the larger community, employment status and work quality, and self-care skills. At the same time a growing emphasis in the schizophrenia literature has been placed on the use of scales designed to assess the construct of subjective quality-of-life (sQOL) or life satisfaction (e.g., Test et al., 2005), particularly given its expressed importance by people with schizophrenia. sQOL, according to the extant literature, specifically refers to client satisfaction across life domains parallel to those typically assessed by measures of objective psychosocial function or QOL. For example, the domain of social relations might be measured in an objective scale by asking questions about the frequency of the patient's social contacts, e.g., “How often do you spend time with close friends?” In contrast, sQOL for social relations measures patient satisfaction, asking for a subjective assessment of quality of the client's interactions with others, e.g. “Are you satisfied with the amount of time you spend with other people?” (e.g., Lehman 1988; Lehman et al., 1996).

Despite the clear importance of sQOL as an outcome measure in studies of schizophrenia, along with the emergence of more refined tools for measuring sQOL, an understanding of factors that affect sQOL and how these factors interact in people with schizophrenia remains largely unexplored. An obvious candidate would be persistent,

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https://doi.org/10.1016/j.psychres.2018.12.149
Received 29 September 2018; Received in revised form 28 December 2018; Accepted 28 December 2018
Available online 29 December 2018
0165-1781/

treatment refractory psychiatric symptoms. Some studies evaluating psychiatric symptoms and sQOL have found associations between measures of depression and sQOL, but not positive and negative symptoms (e.g., Narvaez et al., 2008; Ruggeri et al., 2005) while other studies have found that negative, but not positive symptoms are modestly linked to sQOL (Kurtz & Tolman, 2011).

Another potential determinant of sQOL could be neurocognitive function. Individuals diagnosed with schizophrenia consistently show 1–2 SD deficits on measures of speed of processing, attention/vigilance, working memory, verbal learning and memory, visual learning and memory, reasoning and problem solving and these effects are consistent across different stages of illness, and across different regions of the world (e.g., Mesholam-Gately et al., 2009; Schaefer et al., 2013). Particular significance has been attached to these deficits as many have been moderately associated both cross-sectionally and longitudinally, with impaired psychosocial function and objective measures of QOL in individuals with schizophrenia. Moreover, these deficits may actually better account for the diversity of community outcomes in schizophrenia than positive or negative symptoms (Green, 1996; Green et al., 2000; Green et al., 2015). The relationship of these deficits to sQOL, however, remains less well understood.

Studies of neurocognition and sQOL have yielded conflicting findings with some studies reporting no relationships between neurocognition and sQOL (Brissos et al., 2008; Chino et al., 2009; Hofer et al., 2005; Smith et al., 1999), others reporting negative relationships (Brekke et al., 2001; Corrigan & Buican, 1995; Dickerson et al., 1998; Narvaez et al., 2008), and still others reporting positive relationships (Alpetkin et al.; 2005; Herman, 2004). Differences between study findings may be related to sample size and characteristics and /or neurocognitive and sQOL measures selected. In a meta-analytic investigation of studies of neurocognition and sQOL in schizophrenia (Tolman & Kurtz, 2012) measures of crystallized verbal ability and processing speed were modestly negatively correlated with sQOL ($d = -0.29$, and $d = -0.19$, respectively), while verbal fluency was modestly and positively correlated ($d = 0.26$) with sQOL. These findings were not moderated by psychiatric symptoms.

Another potential determinant of sQOL and objective functional outcome is insight into illness. A systematic review of the research literature investigating factors influencing clinical insight in psychosis have revealed that links between insight and functioning (measured with objective measures) was documented in 8 out of 13 published cross-sectional studies and 5 of 5 longitudinal studies (Lincoln et al., 2007).

Data on cognitive and social cognitive deficits in samples of people living with schizophrenia, as well as the relationship of these deficits to measures of function in other parts of the world outside of high-income, Western countries (US and Europe) remains sparse. Studies of cognition in schizophrenia in cultures outside the US and Europe suggest equivalence across cultures. Indeed, in a recent meta-analysis evaluating cognitive and social cognitive deficits in samples of people with schizophrenia from 28 studies in the in the US, 47 in Europe and 17 from Asia, measures of impairment in overall cognition were remarkably stable (ESs ranging from 1.02 to 1.08) across these different areas of the world (Schaefer et al., 2013).

In contrast, there is reason to suspect that patterns of functional disability, and the relationship between cognition and functional disability in schizophrenia might be different other parts of the world, with differences in family, and social structure across cultures, as well as the differential provision of government financial disability support potentially exerting an impact on measures of disability. Several seminal, longitudinal multi-site studies directed by the World Health Organization revealed that outcome, while impaired at all sites as measured by psychiatric symptoms and psychosocial function, was considerably more favorable for individuals with schizophrenia assessed in study sites located in lower and middle-income countries (e.g., Ibadan, Nigeria; Agra, India) as compared to high income countries (e.g., Washington, D.C., USA, London, UK; WHO, 1973; Jablensky et al., 1992). More recent literature reviews that have included studies from a wider range of low and middle-income countries however have raised questions regarding better social and employment outcomes (Cohen et al., 2008) and at least one recent study suggests similar relationships between cognition, symptoms and functional disability in people with schizophrenia in India as compared to studies from higher-income countries (Bhagyavathi et al., 2015).

The goal of the current study was to compare demographic, symptom and cognitive factors contributing to sQOL or life satisfaction on the one hand, and a measure of objective psychosocial function on the other, in a sample of people with schizophrenia within 5 years of diagnosis in southern India. To our knowledge no study has compared these factors directly across these two different classes of scales within the first 5 years after schizophrenia diagnosis. The advantage of studying these factors in this context is two-fold: (1) as treatment approaches to schizophrenia within the first few years after diagnosis become more refined and effective (e.g., National Institute of Mental Health-funded Recovery after Initial Schizophrenia Episode Initiative) understanding illness features that link to sQOL and objective psychosocial function at this early stage of illness take on greater prominence for enhancing treatment adherence. Persistent low levels of life satisfaction and psychosocial function likely interfere with treatment engagement in this population (Addington et al., 2015) and a growing number of studies support the idea that early engagement in treatment is linked to reduced long-term disability (e.g., Jeppesen et al., 2005); (2) it permits the investigation of these factors without the confounding effects of multiple hospitalizations, long-term neuroleptic exposure, and the sustained stress of managing a severe mental disorder.

We hypothesized that: (1) positive symptoms would be unrelated or only weakly related to sQOL and other-rated psychosocial function consistent with studies in chronic schizophrenia (e.g., Narvaez et al., 2008; Eack & Newhill, 2007), (2) negative symptoms would be linked to both sQOL and other-rated psychosocial measures, and (3) cognitive skills would be linked negatively to sQOL, and positively to objective psychosocial status.

2. Methods

2.1. Procedure

Relevant institutional review boards approved all study procedures and all participants provided written, informed consent.

2.2. Participants

Fifty-nine adult outpatients meeting ICD-10 (WHO, 1994) criteria for schizophrenia or schizoaffective disorder as assessed by a team psychiatrist using interview and case history information, participated in the study. Recruitment was continuous over a period of two years (2014–2015) and occurred at the Schizophrenia Research Foundation in Tamil Nadu, India. The current report includes data from a previous report of neurocognitive and symptom predictors of objective psychosocial function at a 1-year follow-up (Kurtz et al., 2018) but reports data from two scales (SWL and WHODAS at study entry) not described in that paper. Services at the Foundation consist of in and outpatient care including medication management, rehabilitative interventions, family support, and vocational training. For people with schizophrenia inclusion criteria was at least 18 years of age and a first-time diagnosis of schizophrenia within the past five years. Exclusion criteria for people with schizophrenia included uncorrected auditory or visual impairment, traumatic brain injury with a sustained loss of consciousness, presence or history of any neurologic illness other than schizophrenia to ensure generalizability, lack of proficiency in Tamil or English, and/or criteria met for concurrent substance abuse or dependence, and exacerbation of illness within the previous month. Exacerbation of illness

was assessed through information documented in the participant's clinical case record. With the exception of one participant, all other participants with schizophrenia were treated with typical or atypical antipsychotic medication.

2.3. Assessments

All cognitive, symptom and functional disability data collection was under the supervision of a US licensed psychologist (MMK). Study participants were assessed with all outcome assessments at entry to the study. Participants were assessed in English or Tamil according to their preferred language.

2.3.1. Neurocognitive assessments

MATRICS Consensus Cognitive Battery (MCCB; Nuechterlein & Green, 2006*)*: The MCCB includes state-of-the-art cognitive probes selected by 74 experts using the RAND panel method (Nuechterlein et al., 2008). The battery has strong reliability in schizophrenia (MCCB composite score, ICC = 0.88; Keefe et al., 2011). Secondary to technical difficulties with test administration, the CPT-IP was omitted from the battery in this study. Scores on each of eight cognitive measures were transformed into T-scores in relation to scores from published norms and averaged to create a summary cognitive T-score from the battery. Factor scores of Working Memory and Processing Speed were also analyzed. Scores from the MSCEIT-Managing Emotions subtest was omitted from this summary T-score as it was deemed a social cognitive rather than cognitive measure. The Psychological Assessment Resources (PAR) published Tamil-translated version of the MCCB was used for Tamil-speaking participants.

2.3.2. Psychosocial function assessment

World Health Organization Disability Assessment Schedule 2.0 (WHODAS-2; WHO, 2001): Developed for use across cultures this interview-based version of the 36-item scale provides information based on the previous month on cognition, mobility, self-care, skill interacting with others, life activities and participation in community activities through a structured interview. Ratings on the cognition subscale were omitted from our subscale analysis as a result of likely method variance with our cognitive assessment measures.

2.3.3. Subjective quality-of-life assessment

Satisfaction with Life (SWL; Stein & Test 1980; Test et al., 2005*)*: An 18-item self-report measure that targets subjective satisfaction with one's living situation, work, social contacts and psychological state with strong evidence of construct validity from data from substantial samples of people with serious and persistent mental illness (Test et al., 2005).

2.3.4. Clinical assessment

The Positive and Negative Syndrome Scale (PANSS; Kay et al., 1987*)*: A commonly used semi-structured interview that generates ratings of signs and symptoms on 30 7-point Likert scale items. Symptom raters for the study (SG and MMK) maintained interrater reliability through periodic rater training sessions, and all raters were trained to a criterion reliability of 0.7 intraclass correlation coefficient (ICC) on this measure.

Insight into Illness: Lack of Judgment and Insight from the PANSS; (Kay et al., 1987) was used to measure illness insight.

Depression: The Depression item from the PANSS (Kay et al., 1987) was used to measure levels of depression.

2.4. Statistical analysis

Data were analyzed using IBM SPSS Statistical Package (version 24, 2016). Homogeneity of variance in all measures was confirmed using Levene's test (Levene, 1960). All variables were checked for normality. Pearson bivariate product-moment correlations and Spearman's rho were computed between the symptom, insight, and cognitive scores with ratings on the WHODAS total and subscale scores as a measure of objective psychosocial function, and total and subscale scores from the SWL as an index of subjective quality-of-life. To assess the independent contribution of neurocognitive and symptom variables to objective psychosocial function and subjective life satisfaction, variables that were significant in these correlations were entered into simultaneous entry multiple linear regression analyses to identify independent predictors of subjective and objective quality-of-life. To contain the number of predictors, only variables having bivariate correlations with each dependent variable at $p \leq .05$ level were included in the multivariate analysis. For all analyses in this article, a p value of ≤ 0.05 was considered to be statistically significant and all tests were two-tailed.

Table 1
Demographic and clinical characteristics of people with schizophrenia.

	SCZ (n = 59)
Age (years)	27.97 (6.53)
Education (years)	14.54 (2.92)
Gender (% male)	56%
Employment Status	44% employed
	32% unemployed
	17% student
	7% housewife
Marital Status	25% married
	70% unmarried
	3% sep./divorced
	2% widowed
Dur Ill (months)	40.75 (21.11)
Age of Onset (years)	24.60 (6.30)
Positive PANSS	13.23 (4.68)
Negative PANSS	14.86 (5.57)

SCZ = schizophrenia; PANSS = Positive and Negative Syndrome Scale.

3. Results

Demographic and clinical data for people with schizophrenia are shown in Table 1. Most participants were young-adults, male and had the equivalent of two years of schooling beyond high school. A majority of participants were unemployed and had never been married.

Table 2 shows the relationship of several key clinical, cognitive and demographic variables and ratings from the subscales and total scales from the SWL. With respect to symptom ratings, the sum of positive symptom ratings from the PANSS was linked to SWL Social subscale scores ($r = -0.32$), SWL Self subscale scores ($r = -0.26$) and SWL total scores ($r = -0.37$). Depression ratings were linked to SWL Social subscale ($r = 0.26$) and total ($r = -0.27$) scores. With respect to cognition, working memory scores from the MATRICS battery were linked to SWL Work subscale scores ($r = -0.30$) and total scores ($r = -0.27$). No demographic characteristics were linked to SWL scores.

Table 3 shows the relationship of several key clinical, cognitive and demographic variables and ratings from the WHODAS. With respect to symptom ratings, the sum of positive symptom ratings from the PANSS was linked to WHODAS Life Activities subscale scores ($r = 0.32$), Community Participation subscale scores ($r = 0.42$) and total scores ($r = 0.35$). The sum of PANSS negative symptom ratings was linked to WHODAS Getting Along with Others ($r = 0.30$), Life Activities ($r = 0.37$), Community Participation ($r = 0.43$) subscales and total ($r = -0.45$) scores. Insight ratings from the PANSS were linked to getting Along with Others ($r = 0.32$), Life Activities ($r = 0.28$) and Total scores ($r = 0.35$). Marital status was linked to Getting Around subscale scores ($r = 0.28$). With respect to cognition, no measures from the MATRICS battery were linked to WHODAS ratings.

Table 4 shows independent predictors of subjective QOL via regression analysis. Independent variables entered included total positive

Table 2
Demographic, symptom and cognitive predictors of sQOL.

Variable	SWL Living	SWL Social	SWL Work	SWL Self	SWL Total
Demographic					
Education	−0.04	−0.21	.03	.10	−0.16
Gender	−0.18	.10	−0.04	.11	.04
Marital Status	.01	−0.15	−0.19	−0.04	−0.14
Symptoms					
Positive	−0.18	−0.32*	−0.25	−0.26*	−0.37**
Negative	.00	.16	−0.07	−0.06	.03
Depression	.02	−0.26*	−0.11	−0.22	−0.27*
Insight	.05	−0.08	−0.10	−0.09	−0.07
Cognitive					
Mean Cognition	−0.02	−0.23	−0.17	−0.01	−0.17
Working Memory	.07	−0.25	−0.30*	−0.11	−0.27*
Processing Speed	−0.09	−0.24	.00	−0.07	−0.17

symptoms from the PANSS, the depression item from the PANSS, and working memory with respect to summary SWL scores, and total positive symptoms and the depression items from the PANSS for the social subscale from the SWL. In the context of these multiple factors only positive symptoms predicted SWL scores. Table 5 show independent predictors of psychosocial function via regression analysis. Independent variables for WHODAS total scores and the Community Participation subscale scores included total positive symptoms, total negative symptoms, and the insight item from the PANSS. In the context of these variables severity of positive and negative symptoms were linked to total WHODAS scores. With respect to the Life Activities subscale from the WHODAS only higher positive symptoms were linked to poorer scores on the Life Activities subtest. Lastly, both higher ratings of positive and negative symptoms from the PANSS were linked to poorer Community Participation scores on the WHODAS.

4. Discussion

To our knowledge this study is among the first to compare demographic, clinical and cognitive predictors of sQOL or life satisfaction and clinician-rated psychosocial function in the same sample of people with schizophrenia within 5 years after diagnosis. The main finding in our study was that psychiatric symptoms, rather than cognitive or demographic variables, were the best independent predictors of both subjective QOL and objective functioning in our sample. Positive symptoms were independent predictors of subjective life satisfaction, while positive and negative symptoms were independent predictors of objective psychosocial status. Depression and cognitive function were also linked to life satisfaction but not objective psychosocial status.

More specifically, hypothesis 1 was not supported: moderate links were evident between positive symptoms and sQOL and importantly these links were evident even when other symptom and cognitive factors were controlled. Also unexpectedly, moderate links were evident between positive symptoms and clinician-rated psychosocial function which also remained when other symptom factors were controlled. We note that these findings, while different from studies in chronic schizophrenia (e.g., Narvaez et al., 2008; Ruggeri et al., 2005) are supported by a recent meta-analysis of 21 studies investigating factors associated with quality-of-life in first-episode schizophrenia. That study

Table 4
Multiple regression analyses of variables predicting subjective life satisfaction (SWL).

Variable	SWL Total[a] (Beta, P-value)		SWL Social[b] (Beta, P-value)	
Positive Symptoms	−0.32	.01	−0.29	.03
Depression	−0.17	.18	−0.18	.17
Working Memory	−0.17	.19	–	–

[a] $R^2 = 0.21$, F = 4.50, $df = 3, 52$, $p = .01$
[b] $R^2 = 0.13$, F = 4.02, $df = 2, 53$, $p = .02$

Table 5
Multiple regression analyses of variables predicting objective psychosocial function (WHODAS).

Variable	WHODAS Total[a] (Beta, p-value)		WHODAS Community Participation[b] (Beta, p-value)		WHODAS Life Activities[c] (beta, p-value)		WHODAS Getting Along with Others[d]	
Positive	.29	.02	.36	.00	.26	.04	–	–
Negative	.35	.01	.37	.00	.26	.07	.19	.19
Insight	.13	.34	–	–	.13	.34	.23	.11

[a] $R^2 = 0.30$ F = 7.31, $df = 3,52$ $p = .00$
[b] $R^2 = 0.31$, F = 11.82, $df = 2,53$, $p = .00$
[c] $R^2 = 22$, F = 4.80, $df = 3,52$, $p = .00$
[d] $R^2 = 13$, F = 4.04 $df = 2,53$, $p = .02$

Table 3
Demographic, symptom and cognitive predictors of objective psycho0social function.

Variable	Getting Around	Self-Care	Getting Along with Others	Life Activities	Community Participation	WHODAS Overall Percentile
Demographic						
Education	−0.09	−0.12	−0.06	.06	.08	−0.02
Gender	.02	−0.15	−0.15	.02	.10	−0.04
Marital Status	.28*	.20	.01	.03	.05	.12
Symptoms						
Positive	.06	.11	.10	.32*	.42**	.35**
Negative	.17	.26	.30*	.37**	.43**	.45**
Depression	.07	.05	.03	−0.03	.20	.10
Insight	.06	.17	.32*	.28*	.14	.35**
Cognitive						
Mean Cognition	.02	−0.01	−0.21	−0.09	−0.13	−0.14
Working Memory	.06	.05	−0.19	−0.12	−0.16	−0.13
Processing Speed	−0.09	.12	−0.14	.00	.05	−0.08

found more modest but significant links (pooled $r = -0.19$) between positive symptoms from the PANSS and quality-of-life measures that included a mix of subjective and objectively-rated items (Watson et al., 2018). Taken together, these findings might suggest a larger role for positive symptoms in measures of subjective and objective outcome in the first 5 years after diagnosis in outpatients with schizophrenia as compared to more chronic samples. With respect to subjective QOL findings, given the low levels of positive symptoms in this sample, these may suggest even low levels of residual positive symptoms (mean PANSS Positive score = 13.23) are perceived as limiting and/or stigmatizing by people with schizophrenia.

Hypothesis 2 was partially confirmed regarding the role of negative symptoms as a predictor of objective psychosocial function. Contrary to expectation, negative symptoms were not related to life satisfaction in this sample. One explanation for this unexpected finding may be the very low levels of negative symptoms reported in this sample (PANSS Negative Symptoms mean = 14.86).

With respect to hypothesis 3 we found partial support: one aspect of cognitive function, working memory skills, was linked to poorer ratings of satisfaction with work life and total scores from our scale of sQOL. One speculative interpretation of this finding is that the ability to hold in mind and manipulate information increases the likelihood that clients appreciate the impact of their mental illness on their function relative to peers without mental illness, and thus decrease their level of life satisfaction. Our data suggests this effect might be particularly prominent in the domain of work. It is also possible that poorer working memory skills influence the efficiency of self-appraisal mechanisms resulting in poorer clinical insight and resultant sQOL (Nair et al., 2014). Taken together, These findings are broadly consistent with a meta-analysis (Tolman & Kurtz, 2012) of 20 studies that found that stronger performance in several domains of cognition was modestly linked to poorer subjective QOL, as well as at least one specific study showing higher levels of working memory and executive-function specifically linked to lower levels of life satisfaction in people with chronic schizophrenia enrolled in psychiatric rehabilitation programs (Brekke et al., 2001).

In contradiction to our hypothesis, there was no relationship between cognitive function and objective psychosocial status in this sample. We note that failure to find links between cognitive test performance and functioning do not reflect mild levels of deficit in this sample relative to healthy controls. Indeed, in a previous study (see Kurtz et al., 2008) we demonstrated similar levels of cognitive impairments in this south Indian sample as compared to Western samples. This finding might link to social factors specific to the culture in which the data were collected (e.g., Srinivasan & Turupati, 2005) and/or the high educational level in this sample. Alternatively, the absence of a relationship between objective function measures and cognitive test performance in this study may simply reflect the limitations of patient self-report upon which WHODAS ratings in the study were based, and/or that the measure of objective psychosocial function selected for this study (WHODAS), with its focus on self-care and mobility ratings, may not have been optimally sensitive to the psychosocial challenges confronted by individuals with schizophrenia early in the course of their illness.

Poorer insight was linked to poorer objective psychosocial function in our dataset with a focus on specific skills in getting along with others and daily life activities. This finding is consistent with a growing body of research (i.e., Lincoln et al., 2007). However, measures of insight did not provide additional explanatory information on objective psychosocial outcomes beyond that provided by positive and negative symptoms (see Table 5).

Lastly, links between depression ratings and sQOL were evident. These findings are consistent with a broad literature in chronic schizophrenia (e.g., Narvaez et al., 2008) on the role of depressive symptoms in the construct of sQOL and extend these findings to the first 5 years after diagnosis of schizophrenia. Depressive symptoms were not significant independent predictors of sQOL in our sample when analyzed in concert with positive symptom ratings and working memory skills, again emphasizing the importance of positive symptoms as a factor for determining sQOL in schizophrenia within 5 years of diagnosis.

Several limitations to the current study should be noted: first, the sample size of the study was moderate ($n = 59$) and may have been underpowered to detect some relationships between demographic, clinical and cognitive measures and subjective life satisfaction ratings and objective psychosocial function. Second, our study was cross-sectional and future longitudinal studies will be necessary to determine the degree to which clinical and cognitive factors identified in the study play a role in predicting future subjective life satisfaction and psychosocial function and to provide insight to the directionality of these relationships. Third, different assessment of functioning, including performance-based measures of social and ADL skills, or assessments of work status and quality, might have suggested stronger relationships between cognition and objective functioning than those reported here. Fourth, because our study was exploratory, the number of correlations reported in this study was high and the probability of Type I error was consequently elevated. Fifth, first it remains unknown to what degree current findings reflect changes in the psychometric characteristics of our selected cognitive, function and life satisfaction tests when translated and employed in a novel cultural context. Sixth, insight was measured in this study with a single rating item from the PANSS and thus provided a much less thorough assessment of insight than if a more detailed insight scale has been selected (e.g., Scale to Assess the Unawareness of Mental Disorders [SUMD]).

In summary, in this sample of people with schizophrenia within 5 years of diagnosis we found that: (1) positive symptoms were independent predictors of both subjective life satisfaction and objective psychosocial function; (2) negative symptoms were also an independent predictor of psychosocial status but not subjective life satisfaction, and 3) depression and better working memory skills predicted worse subjective life satisfaction but not objective psychosocial status. These findings emphasize the importance of addressing positive symptoms soon after diagnosis in schizophrenia to possibly improve both subjective satisfaction with life and objective psychosocial function and potentially enhance treatment participation. These findings also emphasize the importance of targeting depression as a means of improving subjective life satisfaction in this client population. More broadly, the differences in patterns of correlations between clinical and cognitive factors and life satisfaction on the one hand, and objective psychosocial function on the other, lend support to the distinction between these constructs, and place emphasis on attending to the distinction of these constructs as endpoints of interventions for people with schizophrenia within the first five years after diagnosis.

Acknowledgements

This study was funded by a Fulbright-Nehru Professional and Academic Excellence Award from the US Department of State and a Grants in Support of Scholarship (GISOS) award from Wesleyan University awarded to the first author.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.psychres.2018.12.149.

References

Addington, J., Heinssen, R.K., Robinson, D.G., Schooler, N.R., Marcy, P., Brunette, M.F., et al., 2015. Duration of untreated psychosis in community treatment settings in the United States. Psychiatr. Serv. 66, 753–756.

Alptekin, K., Akvardar, Y., Akdede, B.B.K., Dumlu, K., Isik, D., Pirincci, F., et al., 2005. Is

quality of life associated with cognitive impairment in schizophrenia? Prog. Neuropsychopharmacol. Biol. Psychiatry 29 (2), 239–244.
Bhagyavathi, H.D., Mehta, U.M., Thirthalli, J., Kumar, C.N., Kumar, J.K., Subbakrishna, D.K., et al., 2015. Cascading and combined effects of cognitive deficits and residual symptoms on functional outcome in schizophrenia -A path analytic approach. Psychiatry Res. 229, 264–271.
Brekke, J.S., Kohrt, B, Green, M.F., 2001. Neuropsychological functioning as a moderator of the relationship between psychosocial functioning and the subjective experience of self and life in schizophrenia. Schizophr. Bull. 27 (4), 697–708.
Brissos, S, Dias, V.V., Carita, A.I, Martinez-Arán, A., 2008. Quality of life in bipolar type I disorder and schizophrenia in remission: clinical and neurocognitive correlates. Psychiatry Res. 160 (1), 55–62.
Chino, B, Nemoto, T, Fujii, C, Mizuno, M, 2009. Subjective assessments of the quality of life, well-being and self-efficacy in patients with schizophrenia. Psychiatry Clin. Neurosci. 63 (4), 521–528.
Cohen, A., Patel, V., Thara, A., Gureje, O., 2008. Questioning an axiom; better prognosis for schizophrenia in the developing world? Schizophr. Bull. 34, 229–2544.
Corrigan, P.W., Buican, B., 1995. The construct validity of subjective quality of life for the severely mentally ill. J. Nerv. Ment. Dis. 183 (5), 281–285.
Dickerson, F., Ringel, N.B., Parente, F., 1998. Subjective quality of life in out-patients with schizophrenia: clinical and utilization correlates. Acta Psychiatr. Scand. 98 (2), 124–127.
Eack, S.M., Newhill, C.E., 2007. Psychiatric symptoms and quality of life in schizophrenia: a meta-analysis. Schizophr. Bull. 33 (5), 1225–1237.
Green, M.F., 1996. What are the functional consequences of neurocognitive deficits in schizophrenia? Am. J. Psychiatry 153, 321–330.
Green, M.F., Kern, R.S., Braff, D.L., Mintz, J., 2000. Neurococognitive deficits and functional outcome in schizophrenia: are we measuring the right stuff? Schizophr. Bull. 26 (1), 119–136.
Green, M.F., Llerena, K., Kern, R.S., 2015. The “right stuff” revisited: what have we learned about the determinants of daily functioning in schizophrenia. Schizophr. Bull. 41, 781–785.
Herman, M., 2004. Neurocognitive functioning and quality of life among dually diagnosed and non-substance abusing schizophrenia inpatients. Int. J. Ment. Health Nurs. 13 (4), 282–291.
Hofer A, Baumgartner S, Bodner T, et al. 2005. Patient outcomes in schizophrenia II: the impact of cognition. Eur. Psychiatry. 20(5-6):395–402.
Jablensky, A., Sartorius, N., Ernberg, G., Anker, M., Korten, A., Cooper, J.E., et al., 1992. . Schizophrenia; manifestations incidence and course in different cultures: A World Health Organization ten-country study. Psychol. Med; Monogr. Suppl. 20, 1–97.
Jeppesen, P., Peterson, L., Thorup, A., Abel, M-B., Oehlenschlager, J., Christenson, T.O., et al., 2005. Br. J. Psychiatry Suppl. 48, s85–s90.
Kay, S.R., Fiszbein, A., Opler, L.A., 1987. The positive and negative syndrome scale for schizophrenia. Schizophr. Bull. 13, 261–276.
Keefe, R.S., Fox, K.H., Harvey, P.D., Cucchiaro, J., Siu, C., Loebel, A., 2011. Characteristics of the MATRICS consensus cognitive battery in a 29-site antipsychotic schizophrenia clinical trial. Schizophr. Res. 125, 161–168.
Kurtz, M.M., Gopal, S., John, S., Thara, R., 2018. Cognition, social cognition and functional disability in early-stage schizophrenia: a study from southern India. Psychiatry Res. 265, 231–237.
Kurtz, M.M., Tolman, A., 2011. Neurocognition, insight into illness and subjective quality-of-life in schizophrenia: what is their relationship? Schizophr. Res. 127, 157–162.
Lehman, A.F., 1988. A quality of life interview for the chronically mentally ill. Eval. Program. Plann. 11, 51–62.
Lehman, A.F., 1996. Measures of quality of life among persons with severe and persistent mental disorders. Soc. Psychiatry Psychiatr. Epidemiol. 31 (2), 78–88.
Levene, H., et al., 1960. Robust tests for equality of variances. In: Ingram, Olkin, Harold, Hotelling (Eds.), Contributions to Probability and Statistics: Essays in Honor of Harold Hotelling. Stanford University Press, Stanford, CA, pp. 278–292.
Lincoln, T.M., Lullman, E., Rief, W., 2007. Correlates and long-term consequences of poor insight in patients with schizophrenia: a systematic review. Schizophr. Bull. 33, 1324–1342.
Mesholam-Gately, R.I., Giuliano, A.J., Goff, K.P., Faraone, S.V., Seidman, L.J., 2009. Neurocognition in first-episode schizophrenia: a meta-analytic review. Neuropsychology 23, 315–336.
Nair, A., Palmer, E.C., Aleman, A., David, A.S., 2014. Relationship between cognition, clinical and cognitive insight in psychotic disorders: a review and meta-analysis. Schizophr. Res. 152, 191–200.
Narvaez, J.M., Twamley, E.W., McKibbin, C.L., Heaton, R.K., Patterson, T.L., 2008. Subjective and objective quality of life in schizophrenia. Schizophr. Res. 98 (1-3), 201–208.
Nuechterlein, K.H., Green, M.F., 2006. MATRICS Consensus Battery Manual. MATRICS Assessment Inc, Los Angeles.
Nuechterlein, K.H., Green, M.F., Kern, R.S., Baade, L.E., Barch, D.M., Cohen, J.D., Essock, S., Frese, F., Gold, J., Goldberg, T., Heaton, R.K., Keefe, R.S., Kramer, H., Mesholam-Gately, R., Seidman, L.J., Stover, E., Weinberger, D., Zalcman, S., Marder, S.R., 2008. The MATRICS consensus cognitive battery: part 1: tests selection, reliability and validity. Am. J. Psychiatry 165, 203–213.
Ruggeri, M., Nose, M., Bonetto, C., Cristofalao, D., Lasalvia, A., Salvi, G., et al., 2005. Changes and predictors of change in objective and subjective quality-of-life: multi-wave follow-up study in community psychiatric practice. Br. J. Psychiatry. 187, 121–130.
Schaefer, J., Giagrande, E., Weinberger, D.R., Dickinson, D., 2013. The global cognitive impairment in schizophrenia: consistent over decades and around the world. Schizophr. Res. 150, 42–50.
Smith, T.E., Hull, J.W., Goodman, M, Hedeyat-Harris, A., Willson, D.F., Israel, L.M., et al., 1999. The relative influence of symptoms, insight, and neurocognition on social adjustment in schizophrenia and schizoaffective disorder. J. Nerv. Ment. Dis. 187 (2), 102–108.
Srinivasan, L., Tirupati, S., 2005. Relationship between cognition and work functioning among patients with schizophrenia in an urban area of India. Psychiatr. Serv. 56, 1423–1428.
Stein, L.I., Test, M.A., 1980. Alternatives to mental hospital treatment: Conceptual model treatment program and clinical evaluation. Arch. Gen. Psychiatry 37, 392–397.
Test, M.A., Greenberg, J.S., Long, J.D., Brekke, J.S., Burke, S.S., 2005. Construct validity of a measure of subjective satisfaction with life of adults with severe mental illness. Psychiat. Serv. 56, 292–300.
Tolman, A.W., Kurtz, M.M., 2012. Neurocognitive predictors of objective and subjective quality of life in individuals with schizophrenia: a meta-analytic investigation. Schizophr. Bull. 38, 304–315.
Watson, P., Zhang, J.P., Rizvi, A., Tamaiev, J., Birnbaum, M.L., Kane, J., 2018. A meta-analysis of factors associated with quality of life in first episode psychosis. Schizophr. Res. 202, 26–36.
World Health Organization Disability Assessment Schedule 2.0 (WHODAS II, 2001. In: WHO.
World Health Organization. 1994. ICD-10. New York: World Health Organization.
World Health Organization, 1973. International Pilot Study of Schizophrenia. World Health Organization, New York.