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Impact of panic attacks on quality of life among patients with schizophrenia

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ABSTRACT

Objective: Schizophrenia patients had decreased levels of quality of life compared to normal population. The aim of this study was to investigate the impact of panic attacks on quality of life in patients with schizophrenia.

Methods: Eighty-eight patients with schizophrenia and 85 healthy subjects were included in the study. World Health Organization Quality of Life Instrument-Short Form (WHOQOL-Bref) was given to patients and healthy subjects to assess quality of life. Panic module of Structured Clinical Interview for DSM-IV (SCID) was administered to patients for diagnosis of panic attacks and panic disorder. Positive and Negative Syndrome Scale (PANSS) for symptom severity and Calgary Depression Scale (CDS) for depressive symptoms were administered to the patients.

Results: Patients with schizophrenia demonstrated significantly lower scores compared to healthy controls in all domains of WHOQOL-Bref. Twenty-five patients (28.4%) with schizophrenia had panic attacks (PA) and 10 patients (11.4%) met criteria for panic disorder (PD). Schizophrenia patients with PA had significantly lower scores on psychological domain of WHOQOL-Bref compared to the patients without PA. Schizophrenic patients with panic attacks had higher CDS scores than patients without PA.

In the multivariate regression analyses the variance in psychological domain of WHOQOL-Bref was explained by depression rather than panic attack.

Conclusion: In patients with schizophrenia comorbid panic attacks may have a negative impact on quality of life, which is associated with depression significantly. Panic attacks and depressive symptomatology must be examined comprehensively in order to improve quality of life in patients with schizophrenia.

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1. Introduction

Schizophrenia, as a disabling disorder generally with an early age of onset, has attracted attention given its drastic negative effects on the patient's quality of life (QOL) (Bengtsson-Tops and Hansson, 1999; Herrman et al., 2002; Alptekin et al., 2004; Akvardar et al., 2006). QOL is defined by the World Health Organization as the "Individuals' perceptions of their position in life in the context of the culture and value systems in which they live, and in relation to their

goals, expectations, standards, and concerns" (The WHOQOL Group, 1995).

It was suggested that QOL has been negatively correlated to both positive and negative symptoms as well as anxiety in patients with schizophrenia (Bow-Thomas et al., 1999; Huppert et al., 2001). QOL is also negatively correlated to depressive symptoms and cognitive impairment in patients with schizophrenia (Alptekin et al., 2005; Wegener et al., 2005). Wegener et al. (2005) investigated contributions of psychiatric symptoms and neuropsychological functioning to quality of life in first-episode psychosis. They assessed QOL of patients with WHOQOL-Bref and depressive symptoms with CDS. It was found that QOL is more strongly related to levels of psychopathology, particularly depression, than neuropsychological deficits in first-episode psychosis. Also Huppert et al. (2001) examined the relationship between QOL and depressive symptomatology in a stabilized outpatient group which diagnosed schizophrenia and schizoaffective disorder. They found that more severe depression, as rated on the Brief Psychiatric Rating Scale (BPRS) (Lukoff et al. 1986), was associated with lower general life satisfaction with daily living, finances, health, and social life subscales of Quality of Life Interview (Lehman 1988).

Abbreviations: BPRS, Brief Psychiatric Rating Scale; CDS, Calgary Depression Scale; DSM-IV, Diagnostic and Statistical Manual of Mental Disorders-Fourth Edition; PA, panic attack; PANSS, Positive and Negative Syndrome Scale; PD, panic disorder; QOL, quality of life; SCID, Structured Clinical Interview for DSM-IV; SPSS, Statistical Package for the Social Sciences; WHOQOL, World Health Organization Quality of Life Instrument; WHOQOL-Bref, World Health Organization Quality of Life Instrument-Short Form.

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However thought disorders in patients with schizophrenia did not affect QOL (Ulaş et al., 2008). Also sociodemographic characteristics of patients, such as age, sex, employment, marital status, social and family relations were not related to patients' self-assessed quality of life (Browne et al., 1996).

Anxiety disorders are very common throughout the course of schizophrenia. Comorbid panic attacks (PA) in schizophrenia was reported to be 7.1%–63% (Argyle 1990; Higuchi et al., 1999; Labbate et al., 1999; Pitch et al., 2001; Goodwin et al. 2002; Goodwin et al., 2003; Ulaş et al., 2007; Buckley et al., 2009). In a recent study Buckley et al. (2009) has estimated weighted average prevalence of panic attacks and panic disorder in patients with schizophrenia using data of 27 published studies. The majority of these studies focused on outpatients with chronic schizophrenia, five of the studies analyzed the data coming from Epidemiologic Catchment Area survey and two studies investigated the prevalence of panic attacks/disorder in patients with first-episode psychosis. In this study, Buckley et al. found the prevalence of panic attacks 25% and panic disorder 15%.

Despite the high prevalence of anxiety disorders in patients with schizophrenia, there were only a few studies investigating impact of anxiety on quality of life. It was suggested that anxiety comorbidity in patients with schizophrenia has a negative impact on patients' QOL and psychosocial function (Huppert et al., 2001; Braga et al., 2005; Huppert and Smith 2005; Lysaker and Salyer 2007). Higher anxiety ratings on the BPRS were associated with less satisfaction with global QOL, daily activities, family, health and social relationship subscales of Quality of Life Interview, even after adjusted for positive and negative symptoms or depression (Huppert et al., 2001). It was demonstrated in a longitudinal study that the anxiety disorders are the best predictor of QOL in patients with schizophrenia (Huppert and Smith, 2001). In this study stabilized outpatients diagnosed with schizophrenia or schizoaffective disorder were assessed for QOL and symptoms every 3 months for a period of 1 year. They found that changes in anxiety, as rated on the BPRS, were inversely associated with general life satisfaction and satisfaction with many specific domains of Quality of Life Interview. Also it was reported that these relationships were stronger than the relationships of QOL and any other core symptoms of schizophrenia, including depression (Huppert and Smith 2001). Also Lysaker and Salyer (2007) investigated the relation between anxiety symptom severity and QOL in post-acute or stable phase patients with schizophrenia and schizoaffective disorder by using Quality of Life Scale for schizophrenia which was developed by Heinrichs et al. (1984). It was suggested that greater levels of anxiety was related with poorer QOL (Lysaker and Salyer 2007).

Braga et al. (2005) assessed the impact of anxiety disorders on subjective QOL in an outpatient schizophrenic group. It was found that schizophrenic patients with comorbid anxiety disorder exhibited a higher degree of global functional impairment in Sheehan Disability Scale (Leon et al., 1992) than patients without anxiety disorders. In another study Goodwin et al. (2001) investigated the impact of panic attacks on QOL in severe psychotic disorders and they found that panic attacks were associated with poorer quality of life among individuals with severe psychotic disorders than among those who have psychotic disorders without panic attacks. In this study 120 psychotic patients were included in the study. Of these, only 9 patients had schizophrenia and the impact of panic attacks on quality of life among patients with schizophrenia was not reported. None of the studies mentioned above was focused particularly on the effect of panic attacks on QOL in patients with schizophrenia.

2. Aims of the study

The aims of this study were to compare the QOL of patients with schizophrenia and healthy controls and to investigate the impact of

panic attacks on quality of life in patients with schizophrenia and its relation to other symptoms such as depressive symptoms.

3. Methods

3.1. Sample

Eighty-eight patients with schizophrenia who met DSM-IV (American Psychiatric Association, 2000) criteria for schizophrenia were recruited consecutively from the inpatient and outpatient psychiatry clinics of the Medical School of Dokuz Eylül University between January 2009 and December 2009 and 85 healthy subjects were included in the study during the same period. The inclusion criteria were: diagnosis of schizophrenia, age over 18 and giving informed consent to participate in the study. Schizophrenia was diagnosed by two psychiatrists during the regular visits of patients at inpatient or outpatient units. The main non-inclusion criteria were: age over 65 and decompensated organic disease and mental retardation. Healthy subjects were assigned from the inhabitants of the neighborhood near the hospital and these people had no reported physical or psychiatric illness at the time of the study. The patients received information about the aims and design of the study and were asked for informed consent to participate prior the beginning of the structured interview. The study was approved by the ethics review committee of the Medical School of Dokuz Eylül University.

3.2. Instruments

Sociodemographic data form was administered to patient and control group in order to assess sociodemographic characteristics. The control group was interviewed by a psychiatrist using Structured Clinical Interview for DSM-IV (SCID) (First et al., 1997) in order to rule out any axis one psychiatric disorder. Also panic module of SCID was administered to patients for lifetime diagnosis of panic attacks and panic disorder.

The World Health Organization Quality of Life Instrument (WHOQOL) is a generic and subjective QOL instrument. Two versions are available: (i) the full WHOQOL with 100 items and (ii) the WHOQOL-Bref with 26 items. WHOQOL-Bref was used in this study for reasons of brevity. It provides measurement on four domains: physical, psychological, social and environment. The physical domain has 7 questions related to daily activities, treatment compliance, pain and discomfort, sleep and rest, and energy and fatigue. In the psychological domain, there are 6 questions of positive and negative feelings, self-esteem, body image and physical appearance, personal beliefs and attention. The social relationship domain has 3 questions related to personal relationships, social support and sexual activity. The environmental domain explores physical security and safety, financial resources, health and social care and their availability, opportunities for acquiring new information and skills, and participation in and opportunities for recreation and transport via 8 questions. Also there are 2 questions for general QOL in WHOQOL-Bref. Administration of WHOQOL-Bref takes 10–15 min. It is suggested that the WHOQOL is a reliable, subjective Quality of Life Scale (QLS) for schizophrenic patients (The WHOQOL Group, 1998; Orsel et al., 2004). In the WHOQOL-Bref, lower scores mean poor QOL. WHOQOL-Bref was administered to patients and healthy subjects.

Positive and Negative Syndrome Scale (PANSS) (Kay et al., 1987) for symptom severity, Calgary Depression Scale (CDS) (Addington et al., 1990) for depressive symptoms were administered to patients. PANSS is a 30 item rating instrument evaluating the presence or absence and severity of positive, negative and general psychopathology symptoms of schizophrenia. All 30 items are rated on a 7-point scale (1 = absent; 7 = extreme). CDS is a 9 item scale specifically developed for assessment of depression in patients with schizophrenia. All items are rated on a four-point scale: 0 = absent; 1 = mild;

2 = moderate; and 3 = severe. Cronbach's alpha was 0.90 for the CDS (Oskay et al., 2000).

3.3. Statistical analysis

All statistical analyses were performed via Statistical Package for the Social Sciences-15.0 (SPSS). Descriptive data on frequency, proportions, and on the means and standard deviations were obtained with respect to sociodemographic and clinical characteristics of the groups. Prior to analyses, the data were examined for normal distribution using the "explore" section at the descriptive menu of SPSS. As the data showed normal distribution, it was decided to use parametric tests. Comparisons of Quality of Life between groups were carried out via one-way ANOVA. The intergroup differences in continuous variables like age, and education years were analyzed with one-way ANOVA and the group differences in gender, marital status and working status were examined with the χ^2 -test. As the patient and healthy groups showed significant differences in marital and work status (see Table 1), the effects of these independent variables were controlled statistically. The impact of interactions of marital and work status with patient and healthy groups on quality of life was investigated by two-way ANOVA.

As the patient groups with and without PA showed significant difference on depression scores, multiple regression analysis was used to evaluate the predictors of psychological domain of WHOQOL-Bref using ENTER method. In model 1 only panic attack was included and in Model 2 Calgary Depression Scale score was also added. Models were compared using R^2 statistics.

Pearson correlation test was carried out to assess the relationship among measures of QOL and clinical and sociodemographic features. Statistical significance was tested using two-tailed P -value (5% level) and 95% confidence intervals.

4. Results

4.1. Sociodemographic and clinical characteristics

Eighty-eight patients with schizophrenia recruited from the inpatient and outpatient psychiatric units of Dokuz Eylül University Hospital and 85 healthy participants were included in the study. Fifty-four of the patients and 46 of the controls were male. The mean age of

patients and controls were 35.5 (SD = 10.5), 36.1 (SD = 10.1), respectively. The patients were predominantly single and unemployed. There were significant differences between patients and control subjects in marital and working status.

All patients were taking antipsychotic treatment. Five (6%) of the patients were taking one typical antipsychotic, 50 (58%) were taking one atypical antipsychotic and 33 (36%) were taking more than one antipsychotic. In regard to the estimation of average antipsychotic dosages taken at the time of the assessment, the dosages were calculated in terms of chlorpromazine levels (Rey et al., 1989; Thacker, 1996; Woods 2003). The mean antipsychotic dose of chlorpromazine equivalent doses of the patients was 587.8 (SD = 390.5). In addition to antipsychotic treatment unstructured supportive psychotherapy for outpatients and inpatients was administered. Sociodemographic and clinical characteristics of patients and control group are presented in Table 1.

4.2. Comparison of QOL between patient and control groups and clinical correlates

WHOQOL-Bref scores of patients and control group in Physical, Psychological, Social and Environmental domains were compared with one-way ANOVA. Working and marital status were controlled with two-way ANOVA while comparing QOL scores of patients and controls. The patients with schizophrenia demonstrated statistically significant lower scores in all domains of WHOQOL-Bref. Comparisons of QOL domains among groups are shown in Table 2. The group interactions with marital and employment status were non-significant for domains of WHOQOL-Bref.

There were no significant correlations between WHOQOL-Bref scores and sociodemographic and clinical variables of patients such as age, duration of illness, age at onset of the illness, and chlorpromazine equivalent doses. The groups did not show difference on WHOQOL-Bref scores when divided to subgroups regarding gender, marital and working status. The scores in Physical and Environmental domains of WHOQOL-Bref were correlated with subscales and total scores of PANSS. Also there were high negative correlations between CDS scores and all domains of WHOQOL-Bref. Correlation coefficients between WHOQOL-Bref; positive, negative, general psychopathology subscales and total scores of PANSS and CDS are shown in Table 3.

4.3. Impact of panic symptoms on QOL

Twenty-five patients (28.4%) with schizophrenia had PA and 10 patients (11.4%) met criteria for panic disorder (PD). There were no significant differences in age, sex, education years, age at onset of illness, and duration of illness between patients with PA and patients without PA. Sociodemographic and clinical characteristics of patients with PA and without PA are presented in Table 4. Chlorpromazine equivalent dose, type of antipsychotics, mono or polyantipsychotic usage and scores of subscales and total PANSS did not show any significant differences between two groups, either. The two groups showed significant difference on only CDS scores which were statistically higher ($F = 10.6$; $p = 0.002$) in patients with PA. WHOQOL-Bref scores of patients with and without PA in Physical, Psychological, Social and Environmental domains were compared with one-way ANOVA. In univariate analyses, the psychological

Table 1
Sociodemographic and clinical characteristics of patients and control group.

	Patients $n = 88$	Controls $n = 85$	
Sex			NS
Female	34	39	
Male	54	46	
Age (years)	35.5 (SD = 10.5)	36.1 (SD = 10.1)	NS
Education (years)	11.3 (SD = 2.8)	11.2 (SD = 3.9)	NS
Marital status			$df = 1$
Married	14	52	$p < 0.001$
Single	74	33	$\chi^2 = 37.54$
Working status			$df = 1$
Working	17	68	$p < 0.001$
Unemployed	71	17	$\chi^2 = 63.75$
Age at onset (years)	24.8 (SD = 7.7)	–	
Duration of illness	10.5 (SD = 7.9)	–	
Chlorpromazine equivalent dose	587.8 (SD = 390.5)	–	
PANSS			–
Positive	14.2 (SD = 6.9)		
Negative	17.7 (SD = 7.1)		
General psychopathology	33.6 (SD = 10.3)		
Total	65.1 (SD = 21.1)		
CDS	5.1 (SD = 4.6)	–	

NS: Non-significant.

Table 2
Comparison of WHOQOL-Bref scores between patients and control group.

WHOQOL-Bref domains	Schizophrenia	Control group	F	p
Physical	12.6 (SD = 2.7)	16.3 (SD = 2.1)	101.2	<0.001
Psychological	12.1 (SD = 3.1)	15.5 (SD = 2.8)	63.2	<0.001
Social	11.0 (SD = 3.8)	15.1 (SD = 2.8)	65.1	<0.001
Environmental	12.7 (SD = 2.6)	14.0 (SD = 2.7)	9.7	0.02

Table 3
Pearson correlation coefficients between WHOQOL-Bref and PANSS, CDS scores.

	Physical	Psychological	Social	Environmental
PANSS				
Positive	−0.24*	−0.06	−0.16	−0.24*
Negative	−0.06	−0.15	−0.04	−0.03
General	−0.39***	−0.26*	−0.19	−0.30**
Psychopathology				
Total	−0.28**	−0.17	−0.14	−0.22*
CDS	−0.43***	−0.54***	−0.31**	−0.42***

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

domain of WHOQOL-Bref scores was statistically lower in patients with PA ($F = 10.2$; $p = 0.002$) compared to patients without PA. As the two groups showed significant difference on CDS scores, multiple regression analysis was used to evaluate the predictors of psychological domain of WHOQOL-Bref. When only PA was included in the model, PA appeared to be significant. However, when Calgary Depression Scale score was included in the multivariate regression analyses the significance of panic attack was disappeared suggesting that the variance in psychological domain of WHOQOL-Bref were explained by depression rather than panic attack. Results of multiple regression analysis for psychological domain of WHOQOL-Bref including panic attacks and Calgary Depression Scale score were presented in Table 5.

5. Discussion

The objective of this study was to investigate the impact of panic attacks on quality of life in patients with schizophrenia. To our

Table 4
Sociodemographic and clinical characteristics of patients with PA and without PA.

	Patients with PA <i>n</i> = 25	Patients without PA <i>n</i> = 63	
Sex			
Female	10	24	NS
Male	15	39	
Age (years)	35.9 (SD = 10.2)	35.3 (SD = 10.7)	NS
Education (years)	11.4 (SD = 3.9)	11.3 (SD = 3.8)	NS
Marital status			
Married	3	11	NS
Single	22	52	
Working status			
Working	4	13	NS
Unemployed	21	50	
Age at onset (years)	26.0 (SD = 7.9)	24.3 (SD = 7.6)	NS
Duration of illness (years)	9.8 (SD = 8.4)	10.7 (SD = 7.8)	NS
Chlorpromazine equivalent dose	603.0 (SD = 435.8)	581.9 (SD = 375.2)	NS
PANSS			
Positive	14.7 (SD = 7.8)	13.9 (SD = 6.7)	NS
Negative	17.6 (SD = 6.4)	17.8 (SD = 7.4)	NS
General	35.3 (SD = 9.6)	32.8 (SD = 10.5)	NS
Psychopathology			
Total	657.5 (SD = 21.0)	64.1 (SD = 21.2)	NS
CDS	7.5 (SD = 4.1)	4.2 (SD = 4.3)	$F = 10.6$, $P = 0.002$
WHOQOL-Bref			
Physical	11.9 (SD = 4.1)	12.9 (SD = 2.8)	NS
Psychological	10.5 (SD = 2.8)	12.7 (SD = 3.0)	$F = 10.2$, $p = 0.002$
Social	11.1 (SD = 4.0)	10.1 (SD = 3.7)	NS
Environmental	12.6 (SD = 1.8)	12.7 (SD = 2.9)	NS

NS: Non-significant.

Table 5
Results of multiple regression analysis for psychological domain of WHOQOL-Bref including panic attacks and Calgary Depression Scale scores.

	B	Std. Error	t	p
Model 1 ($R^2 = 0.10$)				
Panikata	2.25	0.70	3.20	0.002
Constant	8.26	1.24	6.64	<0.001
Model 2 ($R^2 = 0.35$)				
Panikata	1.05	0.64	1.65	0.102
Calgotop	−0.36	0.06	−5.66	<0.001
Constant	12.16	1.27	9.58	<0.001

knowledge this study is the first, to provide findings suggesting that comorbid panic attacks have a negative impact on QOL, associated with depression significantly among patients with schizophrenia. Consistent with the results of previous studies, the presented study also revealed the worse QOL in patients with schizophrenia compared to healthy subjects.

We found that scores of psychological domain of WHOQOL-Bref were statistically lower in schizophrenic patients with PA. This finding reflects that PA might deteriorate QOL in patients with schizophrenia. There were only a few studies which investigate the impact of anxiety on quality of life and these studies reported that anxiety comorbidity in patients with schizophrenia has negatively affected patients' QOL and psychosocial functioning (Huppert et al., 2001; Braga et al., 2005; Huppert and Smith 2005; Lysaker and Salyer 2007). But none of those focused on impact of panic attacks on the QOL among schizophrenic patients. In these studies Huppert et al. (2001), Huppert and Smith (2005) and Lysaker and Salyer (2007) investigated the impact of anxiety symptom severity on QOL in stabilized outpatients with schizophrenia and schizoaffective disorders. Although Braga et al. (2005) investigated the impact of anxiety disorders on subjective QOL by using Sheehan Disability Scale in outpatients with schizophrenia; the effect of panic attacks on QOL was not assessed specifically due to the relatively small sample.

Psychological domain of WHOQOL-Bref evaluates the positive and negative feelings; self-esteem; body image and physical appearance; personal beliefs and attention of patients (Bobes et al., 2005; The WHOQOL Group). Cognitive and physical symptoms of PA and depression might negatively affect the psychological domain of WHOQOL-Bref, but we did not determine which symptoms of PA are particularly related to psychological domain. This might be one of the limitations of our study.

Consistent with the findings of previous studies we found that schizophrenic patients with PA demonstrate more severe depressive symptoms than patients without PA (Higuchi et al., 1999; Huppert et al., 2001; Ulaş et al., 2007). It was reported that schizophrenic patients with PA had higher Hamilton Depression Rating Scale (Williams, 1978) scores than those who did not have PA (Higuchi et al., 1999; Ulaş et al., 2007). Also Huppert et al. (2001) found that depressive symptom severity, as rated on the Brief Psychiatric Rating Scale (BPRS) (Lukoff et al. 1986), was associated with lower QOL scores in Quality of Life Interview (Lehman 1988). In these studies the association of PA and depression on QOL was not evaluated. In our study, the multivariate regression analysis showed that the negative effect of PA on QOL, was associated with depression significantly.

The high prevalence of PA and PD in the sample of our study was consistent with the findings of previous studies (Argyle 1990; Buckley et al., 2009; Goodwin et al. 2002; Goodwin et al., 2003; Higuchi et al., 1999; Labbate et al., 1999; Pitch et al., 2001; Ulaş et al., 2007). We did not find any difference for age, sex, education years, age at onset of illness, duration of illness, chlorpromazine equivalent dose, mono or polyantipsychotic usage, and PANSS scores between schizophrenic patients who suffered from PA and those who did not. Socio-demographic and clinical parameters such as age, sex, education years, age at onset of illness and duration of illness were investigated

in schizophrenic patients with panic attacks in the previous studies (Baylé et al., 2001; Ulaş et al., 2007). Results of our study were consistent with the findings of previous studies, except age at onset of illness. Although Ulaş et al. (2007) found that panic attacks were significantly higher in patients with early onset schizophrenia; Baylé et al. (2001) did not. Also the effect of panic attacks among patients with schizophrenia on symptom severity was controversial. However Ulaş et al. (2007) found that panic attacks worsened the symptom severity of patients with schizophrenia, whereas Baylé et al. (2001) and Higuchi et al. (1999) did not. It was reported previously that using high doses of antipsychotics was related to manifestation of PA in chronic schizophrenia (Higuchi et al., 1999). In our sample, the patients were mostly using atypical antipsychotics and the chlorpromazine equivalent doses of antipsychotics taken by schizophrenic patients with PA were similar to patients without PA.

QOL in patients with schizophrenia and healthy subjects and impact of clinical parameters on QOL were investigated in this study. The patients with schizophrenia showed worse QOL scores compared to control group as reported in previous studies (Bengtsson-Tops and Hansson, 1999; Herrman et al., 2002; Alptekin et al., 2004; Akvardar et al., 2006). QOL of patients with schizophrenia was not affected by age, sex, marital status and education in our study as reported before (Browne et al., 1996; Ulaş et al., 2008). Bengtsson-Tops and Hansson (1999) had found that objective and subjective measurements of Lancashire Quality of Life Profile showed some differences in a few domains. The patients were estimated as having a higher quality of life by the interviewer if they were employed, had children and close friends, and had a high frequency of family contact. Although self report QOL scales were suggested suitable and valid for patients with schizophrenia (Herrman et al., 2002; Whitty et al., 2004), subjective QOL scales might still have some limitations compared to objective QOL scales regarding impact of sociodemographic characteristics.

It was reported in previous studies that positive, negative and depressive symptoms of schizophrenia were negatively correlated to QOL (Bow-Thomas et al., 1999; Huppert et al., 2001; Pinikahana et al., 2002; Reine et al., 2003; Eack and Newhill 2007). We also found that positive and general psychopathology subscale of PANSS and CDS scores were negatively correlated with WHOQOL-Bref scores. But we did not find correlation between negative symptoms and QOL of schizophrenic patients. This may be due to the characteristic of the QOL scale. WHOQOL-Bref is a generic, subjective and self rating QOL instrument. In a meta-analysis Eack and Newhill (2007) investigated the relationship of psychiatric symptoms and quality of life in schizophrenia. It was reported in the study that negative correlation between composite, objective, general wellbeing, and health-related QOL scales and negative symptoms of schizophrenia was statistically significant. But correlation between subjective QOL scales and negative symptoms was not significant (Eack and Newhill 2007).

The main limitation of our study was, we did not assess psychiatric comorbidities except for PA and PD in our patient group. Despite this limitation, this study is the first to provide data suggesting that comorbid panic attacks have a negative impact on QOL which is associated with depression significantly, among patients with schizophrenia. It would be therefore reasonable to expect that the treatment of comorbid PA and depression in patients with schizophrenia would improve their QOL. It has been reported that symptom severity, suicidal ideation and psychiatric comorbidity were related to PA in patients with schizophrenia (Goodwin et al., 2002; Ulaş et al., 2007). It was suggested that some individuals with schizophrenia and panic attacks may exhibit marked improvement of positive and negative symptoms after alprazolam is added to their antipsychotic medication (Kahn et al., 1988). The results of our study should alert clinicians to the potential impact of comorbid PA on QOL among persons with schizophrenia, highlighting the importance of diagnosing and treating both disorders when they co-occur. Although the role of depression on negative effect of PA on QOL is significant, the cross-

sectional design of our study limits to explain the nature of this association. Therefore, prospective clinical studies are required to elaborate this relation. Also additional research is needed to illuminate the potential etiologic, neurobiological, and psychosocial mechanisms involved in these relationships.

6. Conclusion

The present study revealed that comorbid panic attacks have a negative impact on QOL, which is associated with depression significantly, among patients with schizophrenia. These data also indicate that the prevalence of PA and PD in schizophrenic patients was high and schizophrenic patients with PA demonstrate more severe depressive symptoms than patients without PA.

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