

The Relationship between Attention/Vigilance and Symptom Severity in Schizophrenic Patients

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Objective: In schizophrenia, neurocognitive functions are one to two standard deviations below the normal controls and these deficits have a significant relationship with overall functioning and poor outcome. According to this fact, it is important to investigate the factors that effect neurocognition in schizophrenic patients. This study was carried out to demonstrate the relationship between attention/vigilance and some demographic and clinical variables in Iranian schizophrenic patients.

Methods: This was a cross-sectional study; the participants were 60 Iranian schizophrenic patients. They were assessed using the Positive and Negative Syndrome Scale, and the Continuous Performance Test.

Results: No significant relationship was found between gender, age, education, Positive and Negative Syndrome Scale scores and CPS scores.

Conclusions: Our findings suggest that contrary to some domains of cognitive functions, in schizophrenia, attention/vigilance is not influenced by severity of symptoms.

Keywords: schizophrenia, attention, symptom severity

Iran J Psychiatry 2012; 7:22-25

The neurocognitive abilities include memory, attention/vigilance, executive functioning, speed of processing, working memory and problem solving.

Neurocognitive impairment in schizophrenic patients is clinically significant. Studies have shown a significant relationship between neurocognitive deficits and lower social, interpersonal and occupational functioning, lower quality of life and poor outcome (1-5)

In schizophrenia, neurocognitive functions are one to two standard deviations below the normal controls, and some of these impairments are present in schizophrenic patients even before the onset of schizophrenia; sometimes some of the patients' siblings who never represent psychosis show some degree of neurocognitive impairments too. (5, 6). According to the significant role of neurocognitive functions in patients' function, it is important to investigate the factors that influence neurocognition.

Some studies conducted on schizophrenic patients have shown a relationship between cognitive functions and some demographic and clinical factors such as age, gender, duration of disorder, severity of positive and negative symptoms and smoking habits (7-11). The aim of this study was to determine the relationship between gender, age, the Positive and Negative Syndrome Scale (PANSS) score and attention/vigilance

(as a neurocognitive function) in Iranian schizophrenic patients.

Materials and Method

This was a cross-sectional study; the participants were 60 schizophrenic patients consecutively admitted to outpatient service in a university hospital named Iran Hospital of Psychiatry. This center has no selective admission policy and admits patients from all over the country.

Diagnosis of schizophrenia was made by an experienced psychiatrist after obtaining an informed written consent and by reviewing medical records and utilizing the Structured Clinical Interview for DSM-IV disorders (SCID-1). The validity and reliability of the Persian version of SCID-1 has been shown validated on a large sample of Iranian patients. (12)

Inclusion criteria were: 1- Diagnosis of schizophrenia for at least 2 years; 2- Maintenance of main antipsychotic drug therapy for at least 8 weeks; 3-Age range of 20–65 years; 4- No mental retardation; 5-No deficit which interfere with doing CPT e.g. normal or corrected vision; 6-No systemic or neurologic disease; 7- No electroconvulsive therapy in the last 5 years; 8- No lifetime history of substance dependence; 9-No history of head trauma.

Patients were assessed using the Positive and Negative Syndrome Scale (PANSS) which is a 30-item instrument with three subscales evaluating positive and negative symptoms and global psychopathology. The PANSS was scored by summation of ratings across items, such that the potential ranges are 0-42 for the Positive and Negative Scales, and 16-112 for the General Psychopathology Scale. Each item on the PANSS is accompanied by a complete definition as well as detailed anchoring criteria for all the seven rating points, which represent increasing levels of psychopathology: 0 = absent, 1 = minimal, 2 = mild, 3 = moderate, 4 = moderate, 5 = severe, and 6 = extreme. The reliability and validity of the scale have been verified. In this study, we only used the Positive and Negative subscales and assessed the inter-rater reliability in twenty five percent of the subjects. (13, 14 Attention was assessed by CPT .

CPT or Continuous Performance Test: It measures a person's sustained and selective attention and impulsivity. Clients are presented with a repetitive, "boring" task and must maintain their focus over a period of time in order to respond to targets or inhibit response to foils. Four main scores are used:

Correct Detection: This indicates the number of times the client responded to the target stimulus. Higher rates of correct detections indicate better attentional capacity.

Reaction times: It measures the amount of time between the presentation of the stimulus and the client's response.

Omission errors: This indicates the number of times the target was presented, but the client did not respond/click the mouse. High omission rates indicate that the subject is either not paying attention (distractibility) to stimuli or has a sluggish response.

Commission errors: This score indicates the number of times the client responded but no target was presented. A fast reaction time and high commission error rate points to difficulties with impulsivity. A slow reaction time with high commission and omission errors indicates inattention in general. (15).

Statistical analysis

Pearson's r and Spearman's ρ were used to measure correlation among the CPT scores and other variables including the PANSS Positive and Negative syndrome score, age, gender and educational level also Pearson's r was used for determining the inter-rater reliability of PANSS.

Results

Sixty schizophrenic patients (30 males and 30 females), with a mean age of 44.25 (± 10.2) years (max=60, min=21) were assessed .

Inter-rater reliability of PANSS was 0.68(P<0.01).

The mean of positive PANSS score was 9.58±4.4(3-18). The mean of negative PANSS score was 10.1±6.3 (2-20). Thirty three (55%) patients had predominant positive symptoms and twenty seven (45%) had predominant positive symptoms .

Table 1 demonstrates the correlation of the scores of CPT with other factors.

Discussion

No significant relationship was found between gender, age, education, severity of positive and negative symptoms and CPS scores.

Many researchers have demonstrated that patients with schizophrenia show impairment on tests of attention/vigilance. They further suggested that attention/vigilance deficits in these patients are related to various aspects of outcome, including social deficits, community functioning, and skills acquisition. (2, 4)

In Kishi et al. study, attention had a significant statistical relationship with age (p= 0.0122). However, it did not have a significant statistical association with gender, level of education, duration of illness, current smoker/non-smoker, PANSS and medication dosage (mg/day) (16)

Although some decrease has been reported in neurocognitive function of elderly schizophrenics , the results are inconsistent and like our study some of the results did not confirm the association between age and attention/vigilance(1, 7, 16, 17).Perhaps neurocognitive decline in some elderly patients is a secondary effect of long years of isolated life , or medications' side effects. It may also be simply explained by this point that neurocognitive function deteriorates through the years. In that study verbal memory, working memory and executive function were correlated with negative, positive and composite score of PANSS. However, like this study attention did not have a significant statistical relationship with subscales' score and composite score of PANSS; and this point may indicate that some domains of cognitive functions, except for attention, are influenced by severity of symptoms .

Table 1-Correlations between CPT scores and other variables

CPT measures	Mean±SD(MAX-MIN)	age		Gender		Educational level		positive score		negative score	
		r	p	ρ	p	ρ	p	r	p	r	p
CPT Composite score	137.87± 10.2 (114-150)	0.111	N.S	0.258	N.S	0.261	N.S	0.009	N.S	0.01	N.S.
Omission errors	5.10± 5.794 (0-30)	0.101	N.S	0.275	N.S	0.261	N.S.	0.042	N.S.	0.082	N.S.
commission errors	5.67± 5.590 (0-30)	0.061	N.S	0.239	N.S	0.271	N.S	0.059	N.S	0.076	N.S
Reaction time (msec)	558.1± 94.2 (426-838)	0.174	N.S	0.062	N.S	0.093	N.S	0.01	N.S	0.02	N.S

First, it was suggested that positive symptoms such as hallucination interrupts the performance of cognitive tests. However, in the NIMH CATIE trial like this study, the correlations between positive symptoms and neurocognitive function in five different domains including attention/vigilance were near zero (17).

It was assumed that amotivation (one of negative symptoms) leads to effortless performance. Furthermore, it was theorized that an inattentive patient seems to be amotivated. Therefore there could be a correlation between severe negative symptoms and poor neurocognitive function, but some studies did not confirm this theory (18, 19).

In addition, in some studies, it was found that even some of the patients' siblings who never had symptoms of schizophrenia showed some degree of neurocognitive impairments. (6)

Contrary to the above results, in Addington's study on 38 acutely ill, hospitalized schizophrenic patients, it was found that cognitive deficits including attention impairments were more likely to be associated with high negative symptom ratings than positive symptoms (20).

It is worth mentioning that the difference in the results of these studies might be due to the difference in the number of subjects or the difference in demographic and clinical characteristics.

The subjects in this study were chronic schizophrenic patients, and did not have severe positive or negative symptoms; and this may explain our different results.

In a study carried out by Harvey et al. 97 chronically hospitalized schizophrenics were compared with 37 patients with chronic schizophrenia who lived in nursing homes, and 31 acutely admitted geriatric schizophrenics. In this study, it was revealed that in contrast to the lesser severity of positive symptoms in chronic schizophrenics, cognitive function in acutely admitted patients was better. On the other hand, the difference of negative symptoms scales was not significant between the groups. As a result, it suggested that there was no significant relationship between the severity of symptoms and cognitive function. (21).

Several studies have demonstrated that smoking and medications like antipsychotics and anxiolytics/hypnotics influence cognitive function. (7, 22, 23) Our study did not include this information and this may be the reason for our different results. Besides, this study had other limitations. We did not have healthy controls, and did not collect data on clinical features such as number of hospitalizations, age of onset and duration of disorder. Lastly, in our study, PANSS scores were lesser than our expectation, which can be explained by the fact that our patients were receiving medical treatment and PANSS is a drug sensitive instrument (24-27).

Conclusion

Our findings indicate that contrary to some domains of cognitive functions, in schizophrenia attention/vigilance is not influenced by severity of

symptoms. In addition, according to the significant influence of attention on functional outcome, it is vital to determine the relevant factors. Review of the related literature may reveal several factors that could be associated with cognitive impairments.

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