



DISABILITY AND EXECUTIVE FUNCTIONS IN SCHIZOPHRENIA: A CROSSSECTIONAL STUDY. (RELATION OF DISABILITY WITH EXECUTIVE FUNCTIONS)

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Article Info: Received 06 June 2020; Accepted 28 June 2020

DOI: <https://doi.org/10.32553/ijmbs.v4i6.1259>

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Conflict of interest: No conflict of interest.

Abstract

The aim of the study was to see if there is any association between disability, positive- negative symptoms and executive functions in patients of schizophrenia.

Study had a crosssectional design with purposive sampling in 50 patients with schizophrenia. Subjects were assessed using sociodemographic and clinical data sheet, PANSS, IDEAS (disability) and WCST (executive functions).

The result of the study revealed that poor executive functioning is responsible for functional impairment in patients with schizophrenia. A significant association was seen between IDEAS and WCST variables in patients of schizophrenia. A significant association was also seen between PANSS (positive and negative score) with IDEAS and WCST variables (disability and executive functions being more strongly associated with negative symptoms). On correlation analysis of socio-demographic and clinical data with IDEAS and WCST variables, a significant correlation (positive) of age and duration of illness was seen with IDEAS. Age and drug dosage were having significant (positive) correlation with WCST variable and education was found to be having significant (negative) correlation with WCST variables.

Executive functions and negative symptoms are crucial for functional outcome and independent living and are important target for intervention in order to reduce disability and improve quality of life in patients suffering from Schizophrenia.

Keywords: Schizophrenia, Disability, Positive–negative symptoms, Executive functions.

Introduction

Schizophrenia is a severe psychiatric disorder that involves cognition, emotion, perception and other aspects of behavior. Schizophrenia usually starts during younger age and is frequently associated with deterioration from previous level of functioning. In persons with psychotic disorders nearly 50% had only one psychotic episode while 15% had continuous unremitting illness. In developing countries, a complete remission rate was significant higher as compared with that of developed world (37% vs 15.5%)(1). In a multicenter study done in India, it was found that the patients with disability due to mental illness suffered more discrimination as compared with their counter parts with physical disability. There was very less awareness regarding existing law and social programs. Stigma was a major reason for under utilization of services (2). A proper tool for the measurement of disability will help to plan services, programs and welfare benefits for them (3). Non-adherence to psychotropic medications leads to several important clinical and economic problems including psychotic relapse, increased clinical and

emergency department visits and rehospitalization (4). Nearly 60% of patients with Schizophrenia require rehospitalization. There are many contributory factors behind rehospitalization phenomenon, but medication non adherence happens to be most prominent contributor among all contributors (5).

Schizophrenia and antipsychotics are subject to stigma. The use of antipsychotics is hampered by side-effects that make patients more reluctant to follow prescriptions, a reality that apparently has not improved substantially with the advent of atypical antipsychotics(6)(7).

Executive functions include the capacity to formulate goals, plan and organize goal directed behavior and effectively and monitor and self correct ones behavior as needed (8). Luria refers to loss of meaningful, directed behavior resulting from frontal lobe lesion, in the absence of marked disturbance in motor activity or sensitivity, gnosis or praxis as a result of rehabilitation (9). Disturbance in executive functions have been structurally related to the prefrontal lobes, neuropsychologically to defective performance in tests of problems solving abilities

and functionally to disability in maintaining a complex behavior sequence without help (10)(11).

The execution functions include volition (i.e, formulation of a goal, motivation to achieve the goal, the planning, purposive action and execution, which involves self monitoring and self correction as well as control of the spatiotemporal aspects of the response (12)(13) .The concept of execution function must be broad enough to include anatomical structures that represent a diverse and diffuse portion of CNS(14).

Rationale for Study

Schizophrenia is a significantly disabling disease that affects all major areas of life. An extensive literature search showed that studies on disability in schizophrenia have been done in the past showing that schizophrenia is associated with significant disability .An extensive research showed that there are few studies done in past estimating any association between disability and executive functions in patients with schizophrenia. This study had estimated association between disability and executive functions in schizophrenia.

Aim and Objectives

The study aimed to see if there is any association between disability, positive-negative symptoms and executive functions in patients of schizophrenia(in remission).

- 1) To assess disability and executive functions in relation to positive and negative symptoms of schizophrenia.
- 2) To study if there is any relation between disability, positive-negative symptoms and executive functions in schizophrenia.

Study population: Patients were taken for the study from the outpatient department of Institute of Mental Health & Hospital, Agra.

Study Design: The study was a crosssectional, hospital based study in which subjects were included using the purposive sampling method.

Sample size: 50 patients with diagnosis of schizophrenia, as per criteria laid by ICD-10 DCR.

Inclusion-Criteria:

- (1) Diagnosis of schizophrenia according to ICD-10 (DCR) currently in remission.
- (2) Patient's age between 18-50 years.
- (3) Minimum education up to 8th standard.
- (4) Minimum duration of illness is 2 years on regular medication of minimum three months duration.

(5) Care-giver should have been in contact with the patient for at least past two weeks time period.

Exclusion Criteria:

- (1) Patients with chronic medical illness.
- (2) Patients with co morbid psychiatric illness or mental-retardation.
- (3) Patients with co-morbid substance abuse or substance dependence(except nicotine)
- (4) Subject not willing to give informed written consent.

Study Tools

- (1) Semi structured proforma for socio-demographic variables.
- (2) Positive and Negative syndrome Scale (PANSS).
- (3) IDEAS (Indian Disability Evaluation and Assessment Scale)(IPS-2002).
- (4) Wisconsin card sorting test (WCST; heaton-1981)

Study Procedure

Informed written consent was taken from the patients. Detailed physical examination was done to rule out any medical or neurology abnormality. Patients were rated on PANSS and only those who attained positive score for individual items of maximum score 3(mild) were taken for study. Patients were rated on IDEAS (Indian disability Evaluation and assessment scale) and were rated as having mild, moderate or severe disability. The selected neurocognitive test Wisconsin card sorting test (WCST) was administered to assess executive functions on each subject.

Statistical method:

Descriptive statistics were used to define sample characteristics.

Pearson's correlation test was used to explore the association between IDEAS (disability) and PANSS (Positive score and negative score) ,WCST variables and PANSS (positive score and negative score); IDEAS(disability) and WCST variables. Non parametric spearman's correlation test was applied to find any significant correlation between socio-demographic and clinical variables and IDEAS

Results

Table1: Descriptive statistics of study proforma (socio demographic and clinical variables)

	N	Minimum	Maximum	Mean	Standard deviation
Age (in years)	50	18.00	50.00	30.98	+_8.74
Education (in years)	50	8	15	11.48	+_2.73
Age of onset (in years)	50	11	43	23.36	+_6.93
Duration of illness (in years)	50	2	23	7.62	+_6.04

Table 1 shows descriptive analysis of socio demographic variables. Age having minimum value of 18 , maximum of 50 , mean value of 30.89 with standard deviation of +_8.74. Education minimum of 8th class, maximum of 15(graduate and above), mean value of 11.48 with standard deviation of +_2.73. Age of onset having minimum value of 11, maximum of 43, mean value of 23.36 with standard deviation of +_6.93. Duration of illness having minimum value of 02 , maximum of 23, mean value of 7.62 with standard deviation of +_6.04.

Table 2: Pearson's correlation between WCST and PANSS in 50 patients with schizophrenia -

	PANSS(Positive)		PANSS(Negative)	
	Correlation value	P value	Correlation value	P value
NOTA	0.219	0.126	0.360	0.010**
TNOC	-0.317	0.25	-0.383	0.006**
TNOE	0.361	0.010**	0.501	0.000**
Percent error	0.318	0.025*	0.462	0.001**
NPE	0.410	0.003**	0.636	0.000**
PNPE	0.418	0.003**	0.639	0.000**
CLR	-0.352	0.012*	-0.498	0.000**
PCLR	-0.368	0.009**	-0.528	0.000**
NOCC	-0.321	0.024*	-0.743	0.000**
TTCFC	0.096	0.513	0.414	0.003**

*correlation is significant at the 0.05level

**correlation is significant at the 0.01 level

On correlating WCST with PANSS positive and negative score we found significant positive correlation of PANSS (positive score) with total number of errors , percent errors, non-perseverative errors and percent non-perseverative errors (WCST variables).A significant negative correlation was found between PANSS(positive score) and conceptual level responses and number of categories completed (WCST variables).We found significant positive correlation of PANSS (negative score)with number of trials administered , total number of errors , percent errors , non- perseverative errors, percent non- perseverative errors ,trials to complete first category (WCST variables).A significant negative correlation was found between PANSS (negative score) and total number of correct , conceptual level responses ,percent , conceptual level responses and number of categories completed (WCST variables)

NOTA : number of trials administered , TNOC : total number of correct ,TNOE: total number of errors , PR : perseverative responses , PPR : percent perseverative responses , PE : perseverative errors , PPE :percent perseverative errors, NPE : non-perseverative errors ,PNPE :percent non-perseverative errors, CLR: conceptual level responses , NOCC: number of categories completed , FTMS : failure to maintain set , LTL : learning to learn.

Table 3: Pearson's correlation between WCST and IDEAS in 50 patients with Schizophrenia –

	IDEAS (Total score)	
	Correlation value	P value
NOTA	0.416	0.003**
TNOC	-0.372	0.008**
TNOE	0.533	0.000**
Percent error	0.490	0.000**
NPE	0.497	0.000**
PNPE	0.475	0.001**
CLR	-0.439	0.001**
NOCC	-0.804	0.000**
FTMS	0.471	0.002**

On correlating WCST and IDEAS in patients of schizophrenia we found that there is significant positive correlation between number of trials administered , total number of errors , percent errors , non-perseverative errors , percent non- perseverative errors (WCST variables) and disability (IDEAS). A significant negative correlation was found between total number of correct , conceptual level responses , number of categories completed (WCST variables) and disability(IDEAS).

Table 4: Spearman's correlation between socio-demographic variables and WCST in 50 patients with Schizophrenia-

	Age (in years)		Education	
	Correlation value	P value	Correlation value	P value
NOTA	0.240	0.094	-0.414	0.003**
TNOE	-0.184	0.201	0.002	0.989
Percent Error	0.262	0.066	-0.166	0.249
PR	0.277	0.052	-0.280	0.049*
PE	0.298	0.036*	-0.277	0.052
NPE	0.034	0.815	-0.179	0.218
CLR	-0.230	0.108	0.190	0.187
LTL	-0.255	0.128	0.354	0.031*

*Correlation is significant at the 0.05 level.

**Correlation is significant at the 0.01 level.

We applied spearman's correlation between socio-demographic variables and WCST in 50 patients of schizophrenia and found a significant positive correlation between age and perseverative errors (WCST variables). A significant positive correlation was found between education and learning to learn (WCS variable). A significant negative correlation was found between education and number of trials administered and perseverative responses (WCST variables).

Discussion

The study was undertaken to investigate association of disability, positive-negative symptoms and executive functions in Schizophrenia. 28 patients were in 18-30 years age group while 22 patients were in 31-50 years age group. Out of 50 patients, 27 patients were male and 23 patients were female. Out of 50

patients, 32 were unemployed and 18 were employed. The higher rate of unemployment may be due to nature of disorder itself, social isolation, psychopathology, poor drug compliance.

Mean age of onset of sample population was 23.36 years with standard deviation of ± 6.93 . Mean duration of illness in sample population was 7.62 years with standard deviation of ± 6.04 . Mean total IDEAS Score in sample population was 8.16 with standard deviation of ± 3.24 . According to International classification, impairment, disability and Handicap (ICIDH, 1980) disability is interference with the activities of whole person in relation to the immediate environment (15).

In a study done by Villalt et al (2006), negative symptoms in 113 patients of schizophrenia were major source of disability. All disability areas except occupational functioning were partially explained by negative dimension (16). Alptekin et al (2005) identified the clinical correlates and prediction of disability during a 1 year follow up period in 382 patients with schizophrenia. This study found that disability in schizophrenia is a clinical phenomenon closely linked to negative symptoms and poor outcomes (17).

The present study examined the relationship between PANSS (Positive score) and WCST Variables which measures executive functioning. PANSS (Positive Score) was significantly positively correlated with total number of errors, percent errors and non-preserved errors (Table 2). Several cross-sectional studies have suggested that performance on neurocognitive tests is only weakly correlated with positive symptoms (18) (19) (20).

The correlation between negative symptoms with executive functions is higher than positive symptoms and executive functions (Table 2).

Our results resembled with the results of previous studies. Negative symptoms or deficit syndrome patients have particular improvement in reasoning and problem solving (21)(22)(23).

The above results suggest severity of psychopathology is associated with poor executive functioning.

The present study examined the relationship between the extent of disability and execution functioning of patients with schizophrenia using IDEAS and WCST. IDEAS total score was positively correlated with number of trials administered, total number of errors, Percent errors, non-persistent errors (Table 3). The result suggests that poor executive functioning is responsible for functional impairment in patients with schizophrenia. Execution function, processing speed and working memory also predicted social function among a small group of patients with early onset schizophrenia after a 13 years follow up period (24,25,26).

The results indicate that educational level has association with concept formation, cognitive flexibility and learning capacity (Table 4).

Srinivasan et al (2005) reported a relationship between age, duration in formal education and neurocognitive functions in a sample of Indian population (27).

Conclusion and Future Directions

Schizophrenia is a severe psychotic disorder characterized by chronic and relapsing course with generally incomplete remissions, functional decline frequent psychiatric comorbidities and increased mortality. Executive functioning has been found to be crucial for occupational outcomes and independent living. Results of the present study revealed significant relationship of disability with executive functions and symptoms. Disability is associated more with negative symptoms.

The implications of these findings are that cognitive and negative symptoms are important target for intervention in patients with schizophrenia, if greater clinical and functional success is to be achieved and cost of service use is to be reduced. The psychological management can play significant role in achieving management goals.

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