

The Relationship of Cognitive Functions and Psychopathology on The Level of Insight in Patients with Schizophrenia

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Abstract:

International Pilot Study of Schizophrenia (IPSS) reported a substantial proportion of patients with schizophrenia (80%) demonstrate poor insight into the illness, irrespective of the cultural variation of patients. Literature shows that there are conflicting findings regarding the relationships between impaired insights, positive and negative symptoms and neurocognition in patients with schizophrenia. The present study aimed to examine 'The Relationship of Cognitive Functions and Psychopathology on the Level of Insight in Patients with Schizophrenia'. This was a hospital based cross sectional study conducted at SRM Medical College Hospital and Research Centre, Kancheepuram in the Department of Psychiatry / Clinical Psychology and Purposive sampling method was used. The sample comprises 32 patients with Schizophrenia, fulfilling the inclusion and exclusion criteria. Written informed consent was taken from the patients after explaining the objectives and procedure of the study. Subsequently socio demographic data sheet, Positive and negative syndrome scale (PANSS), Scale for the assessment of unawareness of mental disorder (SUMD), Comprehensive trail making test (CTMT), Wisconsin card sorting test (WCST) and PGI memory scale (PGIMS) were administered to all patients. Data was analyzed using (SPSS) 16.0 versions. Spearman rank correlation was used to analyze the relationship between insight, cognitive functions and psychopathology. The result showed a significant positive association between SUMD 2 (awareness of achieved effects of medication) and positive and negative symptoms of PANSS. The study also finds a significant negative relationship between SUMD 2 (awareness of achieved effects of medication) and attention and concentration and recent memory, on the subtests of PGI-MS. However there was no significant relationship between SUMD scores, CTMT and WCST scores. These findings confirmed the importance of insight in patients with schizophrenia for clinical understanding and management of schizophrenia.

Keywords: Memory, Set Shifting, Positive and Negative symptoms.

I. INTRODUCTION

Poor insight or lack of insight in patients with schizophrenia is considered as an established fact. There are various definitions for insight that has been reported in the literature (Lewis, 1934; Jaspers, 1964; Carpenter, 1973). One of the comprehensive definitions for insight was given by David (1990) defined insight under three distinct dimension, the recognition that one has a mental illness (awareness), the ability to re-label unusual mental events (delusions and hallucinations) as pathological and the recognition of (the need for treatment) action. Poor insight in patients with schizophrenia may be due to positive or negative symptoms, sometimes it can be a defensive coping strategy; it can also be the manifestation of impaired neurocognition (Smith et al., 2000). The etiology theory of positive symptoms explains poor insight as a delusion of health —a specific type of delusion wherein the individual with schizophrenia forcibly denies the presence of a mental illness even in the face of obvious evidence of interference with daily functioning (Collins et al., 1997). In a study by Nieto et al. (2012) examined 96 acute psychotic adults and reported that insight showed significant and moderate positive correlations with positive and general symptoms but not with negative symptoms. Similarly, Ekinci & Ekinci (2013) in their study compared 47 patients between violent schizophrenia and 86

nonviolent patients with schizophrenia. The author reported that, poor insight is linked to greater positive symptoms and violent behavior in patients with schizophrenia of violent group. Likewise, Tirupati et al. (2007) also assessed 143 never treated and 183 treated patients with schizophrenia and reported an association between insight and positive symptoms. Furthermore, the etiology model of negative symptoms states lack of insight, as mental withdrawal from attempting to understand one's own phenomenological experience of the world (Mintz et al., 2003). Poor insight demonstrated significant correlation with negative symptoms among treated patients and the authors discuss about a possible subgroup of patients who have negative symptoms and poor insight compositely related to treatment resistance (Tirupathi et al., 2007). Correspondingly in a study by Debowska, Grzywa, & Kucharska-pietura (1998) examined paranoid schizophrenia patients and found significant relationships between poor insight and negative symptoms, thought-broadcasting, delusions of grandeur and sexual delusions, and worse premorbid adjustment in late adolescence and adulthood. Furthermore, in another study by Kemp & Lambert (1995) studied 29 patients with schizophrenia and reported that in patients who improved with treatment, insight had a specific correlation with

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negative symptoms. Another etiology theory states that, lack of insight is due to neuropsychological deficit. Ritsner & Blumenkrantz (2007) evaluated 107 patients with schizophrenia and they reported poor insight was attributed to impairment in sustained attention and executive functions. In another research by Subotnik et al. (2005) in their study examined 52 outpatients with schizophrenia and found that attention deficits could be a cause for the inability to define the psychotic phenomena and the associated inability to attribute the psychotic experiences towards mental illness in the patient. Literature shows that there are conflicting findings regarding the relationships among impaired insight, positive and negative symptoms and neurocognition in schizophrenia (Smith et al., 2000). According to the International Pilot Study of Schizophrenia (IPSS), a substantial proportion of patients with schizophrenia (up to 80%) demonstrate poor insight into the illness, irrespective of the cultural variation of patients. Diminished insight is also associated with poor treatment adherence (Bartko, 1988). Hence, it is important to clearly understand the relationship between these variables in order to provide better patient care. Therefore, the present study aimed to examine the relationship between cognitive function, psychopathology and insight in patients with schizophrenia.

II. METHOD

Participants and Procedure

This was a hospital based cross sectional study conducted at SRM Medical College Hospital and Research Centre, Kancheepuram in the Department of Psychiatry / Clinical Psychology and Purposive sampling method was used. The sample comprises 32 patients with Schizophrenia, fulfilling the inclusion and exclusion criteria were taken up for the study. Written informed consent was taken from the patients after explaining the objectives and procedure of the study. Subsequently socio demographic data sheet, Positive and negative syndrome scale (PANSS), Scale for the assessment of unawareness of mental disorder (SUMD), Comprehensive trail making test (CTMT), Wisconsin card sorting test (WCST) and PGI memory scale (PGI MS) were administered to all patients.

Measures

Socio Demographic and Clinical Data Sheet

A specially designed Performa which include various socio demographic details (age, sex, religion, education level, occupation, marital status, family type, socioeconomic status) was taken.

Positive and Negative Syndrome Scale (PANSS) (Kay et al., 1987)

It assesses positive and negative symptoms of schizophrenia and other psychotic disorders. It includes 30 items on 3 subscales: 7 items covering positive symptoms (Delusions, Conceptual disorganization, Hallucinations, Hyperactivity, Grandiosity, Suspiciousness/persecution, Hostility) 7 items covering negative symptoms (Blunted affect, Emotional

withdrawal, Poor rapport, Passive/apathetic social withdrawal, Difficulty in abstract thinking, Lack of spontaneity and flow of conversation, Stereotyped thinking) and 16 items covering general psychopathology (Somatic concern, Anxiety, Guilt feelings, Tension, Mannerisms and posturing, Depression, Motor retardation, Uncooperativeness, Unusual thought content, Disorientation, Poor attention, Lack of judgment and insight, Disturbance of volition, Poor impulse control, Preoccupation, Active social avoidance).

Scale to assess Unawareness of Mental Disorder (SUMD) (Amador and Strauss, 1990)

It was designed to evaluate the multidimensional nature of insight. Scores are rated on a five-point scale (1=complete awareness, 3= partial awareness and 5=no awareness). SUMD sub-scores consist of the three General items (unawareness of a mental disorder, unawareness of the achieved effects of medication and the unawareness of the social consequences of a mental disorder).

Comprehensive Trail Making Test (Reynolds, 2002).

It comprises a standardized set of five visual search and sequencing tasks that are heavily influenced by attention, concentration, visual scanning, speed of eye- hand coordination, information processing, resistance to distraction, and cognitive flexibility. The basic task of trail making is to connect a series of stimuli in a specified order as rapidly as possible. Trail 1 consist of number 1 through 25, each contained in a plain black circle Trail 2 consists of numbers 1 through 25, each contained in a plain black circle. 29 empty distractor circles appear on the same page. Trail 3 consists of numbers 1 through 25, each contained in a plain black circle. 13 empty distractor circles and 19 distractor circles containing irrelevant line drawings appear on the same page. Trail 4 consists of numbers 1 through 20, where 11 of the numbers are presented in Arabic numerals (1, 7) and the remaining numbers are spelled out in English. Trail 5 consists of numbers 1 through 13 and letters A through L, beginning with 1 and drawing a line to A, then 2, then B and so on. Fifteen empty distractor circles appear on the same page.

Wisconsin Card Sorting Test (Heaton et al., 1993)

This is a test to assess abstract reasoning ability and ability to shift cognitive strategies in response to changing environmental contingencies. It consists of four stimulus cards and 128 response cards that depict the figures of varying forms, numbers and colours. The four stimulus cards are placed before the subject. The client is then handed over a deck of 64 response cards and is instructed to match each consecutive cards from the deck with the one of the four stimulus cards whichever he or she thinks matches with the stimulus card. The client is only told whether each response is right or wrong and is never told the correct sorting principles. Once the client is made a specified number or consecutive correct matches to the initial sorting principle (usually to colour) the sorting principle is changed without any warning, requiring the client to use the examiner's feedback to develop a new sorting strategy, the test proceeds in a manner through a number of shifts in a set.

PGI Memory Scale (PGI-MS) (Pershad & Wig, 1977)

It contains 10 subtests and they are: Remote Memory, Recent Memory, Mental Balance, Attention and Concentration, Delayed Recall, Immediate Recall, Retention for similar pairs, Retention for Dissimilar pairs, Visual Retention and Recognition.

Data Analysis

Data was analyzed using the statistical package for social science (SPSS) 16.0 versions. Descriptive statistics were done for socio demographic data. The variables used in this study do not follow normal distribution. Hence non parametric test such as Spearman rank correlation test was used to analyze the relationship between insight, cognitive functions and psychopathology.

III. RESULTS

Table 1: shows the Socio demographic and clinical variables of the Schizophrenia group (N=32)

Variable	Mean $\pm$ SD/ n (n%)	Range
Age	36.56 $\pm$ 9.31	20-55
Education	14.00 $\pm$ 2.91	10-20
Age of onset	27.00 $\pm$ 8.32	17-50
Duration of illness (months)	93.93 $\pm$ 98.82	1-336
Number of hospitalization	2.59 $\pm$ 1.91	0-9
Sex		
Male	23(71.9)	
Female	9(28.1)	
Marital Status		
Never married	19(59.4)	
Married	12(37.5)	
Separated	1(3.1)	
Occupation		
Employed	9(28.1)	
Not employed	13(40.6)	
Currently not employed	10(31.2)	
Religion		
Hindu	17(53.1)	
Muslim	2(6.2)	
Christian	13(40.6)	
Place of living		
Rural	17(53.1)	
Urban	15(46.9)	
Socio economic status		
Lower	5(15.6)	
Middle	23(71.9)	
Upper	4(12.5)	
Family type		
Nuclear	19(59.4)	
Joint	13(40.6)	

Table 1 shows the descriptive statistics of socio demographic and clinical variables of schizophrenia group. The mean age of the group was found to be 36.56 $\pm$ 9.31, the mean education was found to be 14.00 $\pm$ 2.91, the mean age of onset was 27.00 $\pm$ 8.32, the mean duration of illness was 93.93 $\pm$ 98.82 and the mean number of hospitalization was 2.59 $\pm$ 1.91. In this study the schizophrenia group, majority of them were male 23 (71.9) and female 9 (28.1). In marital status majority of them were never married 19 (59.4), 12 (37.5) were married and 1 (3.1) were separated. In occupation majority of them were not employed 13 (40.6), remaining were employed 9 (28.1), and currently not employed were 10 (31.2). In religion majority of them were Hindu 17 (53.1), Christian 13 (40.6) and Muslim 2 (6.2). In the variable place of living 17 (53.1) were Rural and 15 (46.9) were from urban. In the socio economic status 23 (71.9) were middle socio economic status, 5 (15.6) were from lower socio economic status, 4

(12.5) were from upper socio economic status. In the family type 19 (59.4) were from nuclear and 13 (40.6) were from joint family type.

Table 2 shows the correlation analysis of Insight domains and PGI-memory scales subtests of Schizophrenia group (N=32)

Variables	Remote Memory	Recent Memory	Mental Balance	Attention & Concen	Delayed recall	Immediate Recall	Retention for similar pairs	Retention for Dissimilar pairs	Visual Retention	Recognition
SUMD 1 (awareness of mental disorder)	.178	-.271	.196	-.232	-.231	.081	.130	-.036	.080	.017
SUMD 2 (awareness of achieved effects of medication)	.061	-.427*	.204	-.368*	-.256	.014	.157	-.137	-.028	.013
SUMD 3 (awareness of the social consequences of mental disorder)	.057	-.093	.096	-.204	-.170	.277	.114	.053	.049	.134
SUMD-TOTAL	.115	-.288	.170	-.298	-.258	.126	.153	-.051	.054	.058

**p<0.01 *p<0.05

Table 2 shows the Spearman rho correlation analysis of Insight (SUMD) and PGI-memory scales of Schizophrenia group. There is significant negative correlation between SUMD2 (awareness of achieved effects of medication) and PGI - Recent Memory ($\rho = -0.427$, $p < 0.015$) which is significant at .05 level. Similarly there is a significant negative correlation between SUMD2 (awareness of achieved effects of medication) and PGI- Attention and Concentration ($\rho = -0.368$, $p < 0.038$) which is significant at .05 level.

Table 3 shows the correlation analysis of Insight domains and comprehensive trail making test (CTMT) subtests of schizophrenia group (N=32)

Variables	CTMT1	CTMT2	CTMT3	CTMT4	CTMT5
SUMD 1 (awareness of mental disorder)	.101	.064	.155	.102	.226
SUMD 2 (awareness of achieved effects of medication)	.122	.088	.228	.105	.235
SUMD 3 (awareness of the social consequences of mental disorder)	.028	-.003	.071	.148	.121
SUMD TOTAL	.076	.043	.143	.108	.207

**p<0.01 *p<0.05

Table 3 shows the Spearman rho correlation analysis of Insight (SUMD) and CTMT of Schizophrenia group. There is no significant correlation between insight domains (SUMD) and Comprehensive Trail Making Test (CTMT).

Table 4: shows the correlation analysis of insight domains and Wisconsin card sorting test (WCST) of schizophrenia group (N=32)

Variables	Total no correct	Total no errors	Perseverative response	Perseverative errors	Non perseverative error	Conceptual level response	Number of categorical completed	Trial to complete first category	Failure to maintain set
SUMD-1 (awareness of mental disorder)	-.084	.159	.158	.164	.235	-.182	-.196	-.144	-.087
SUMD-2 (awareness of achieved effects of medication)	-.134	.175	.236	.245	.080	-.201	-.280	-.091	.070
SUMD-3 (awareness of the social consequences of mental disorder)	-.028	.084	.114	.142	.150	.085	.156	.173	.063
SUMD-TOTAL	-.075	.133	.155	.176	.190	-.157	-.205	-.120	.027

**p<0.01 *p<0.05

Table 4 shows the Spearman rho correlation analysis of Insight (SUMD) and Wisconsin Card Sorting Test (WCST) of Schizophrenia group. There is no significant correlation between Insight domains (SUMD) and Wisconsin Card Sorting Test (WCST).

Table 5 shows the correlation analysis of insight domains (SUMD) and Positive and Negative Syndrome Scale (PANSS) of Schizophrenia group (N=32)

VARIABLES	PANSS-Positive	PANSS-Negative	PANSS-General psychopathology
SUMD1 (awareness of mental disorder)	.173	.293	.152
SUMD2 (awareness of achieved effects of medication)	.442*	.364*	.339
SUMD3 (awareness of the social consequences of mental disorder)	.130	.263	.175
SUMD_TOTAL	.276	.335	.231

**p<0.01 *p<0.05

Table 5 shows the Spearman rho correlation analysis of Insight domains (SUMD) and Psychopathology (PANSS) of Schizophrenia group. There is significant positive correlation between SUMD2 (awareness of achieved effects of medication) and PANSS-positive symptoms ($\rho = 0.442$, $p < 0.011$) which is significant at .05 level. Similarly there is a significant positive correlation between SUMD2 (awareness of achieved effects of medication) and PANSS-negative symptoms ($\rho = 0.364$, $p < 0.041$) which is significant at .05 level.

IV. DISCUSSION

Insight and Attention/Concentration

The current study showed significant negative correlation between 'Awareness of achieved effects of medication' (SUMD2) and attention and concentration which indicates that higher 'Awareness of achieved effects of medication' is associated with poor attention and concentration. In a previous study by Ritsner and Blumenkrantz (2007) showed 107 patients with schizophrenia attributed poor insight regarding medication to impairment in sustained attention. One possible explanation for this finding is poor insight is the salient features of psychosis, which is the result of neuropsychological deficit or a kind of copying style which features denial mode of defensiveness in the patient (Subotnick et al., 2005). In another study by Smith et al. (2000) found a significant relationship between attention and past symptom misattribution (insight). Lysaker and Bell (1995) also reported poor insight is associated with attention deficits. In contrast, Boyer et al. (2012) didn't find any significant correlation between attention and awareness of mental disorder. Similarly a study by Keshavan et al. (2004) reported that there was no relationship between insight and attention. In another study by Kurtz, Olfson and Rose (2013) found no relationship between digit span test and insight.

Insight and Memory

The present study found that there is a significant negative correlation between insight (awareness of the need for

treatment) and recent memory. In contrast Boyer et al. (2012) reported there is no association between memory and insight. One possible explanation can be verbal memory has been linked to a high resistance to modify one's own judgments and difficulty in retrieving past memories (Orfei et al., 2010). Additionally, cognitive insight may rely selectively on verbal memory as it requires reflection and self-searching in memory whereby current experiences are appraised based on previous ones. Further, the magnitude of verbal learning and memory deficits corresponded with the degree of self-certainty. They also suggested that belief inflexibility may cause memories to be held with strong conviction, which may dissuade elaborate searches for previous experiences in memory (Lepage et al., 2008).

Insight and WCST

The Present study didn't find any significance relationship between Insight and WCST. In a study by Mutasta et al. (2006) assessed 94 patients with first episode schizophrenia and reported no association between insight and measures of executive function. Similarly, Choudhary et al. (2009) reported that, there was no significant correlation between insight and poor performance in WCST in 1st assessment. However, there was relationship between insight and 2nd assessment phase of WCST. One possible explanation can be insight had improved significantly, which may have had effect on the overall functioning of the individual executive function. Hence it was highly possible that those who had better insight performed better in WCST (Choudhary et al., 2009). In contrast, Smith et al. (2000) observed the correlation between insight deficits and impaired performance on the Wisconsin card sorting test. Furthermore, WCST perseverative errors correlated positively and the number of categories completed correlated negatively with poor insight, suggesting that impaired insight may be mediated by deficiencies in conceptual organization and flexibility in abstract thinking (Lysaker and Bell, 1995).

Insight and CTMT

The current study didn't find any association between insight and CTMT. This finding is in agreement with the study by Boyer et al. (2012) reported that both TMT-A and TMT-B didn't showed any correlation with insight. In contrast, Diez-Martin et al. (2014) reported a strong correlation between TMT A-B and SUMD scores.

Insight and positive and negative symptoms of patients with schizophrenia

The present study observed that there is a significant positive correlation between 'Awareness of achieved effects of medication' (SUMD2) and PANSS-positive symptoms. This finding is in accordance with the previous study by Mutsatsa et al. (2006) showed an association between positive symptom and acceptance for the need for treatment. In another study by Mingrone et al. (2013) showed that positive symptoms were contributing factors to all three dimensions of insight: awareness of mental illness, awareness of the need for treatment and the awareness of the social consequences of the disorder. Additionally, other previous studies also showed a correlation between insight and positive symptoms (Mintz et al., 2003; Sevy et al., 2004). One Possible explanation for

this effect is delusions could be characterized as loosening of normal everyday associations and difficulties with reasoning; thus, it may not be surprising that when these symptoms are present patients show deficient awareness of their illness (Rossell et al., 2003). Another possible explanation could be that psychotic symptoms and insight may be considered as two sides of the same coin. The loss of the sense of reality” that defines psychotic symptoms i.e. the marked detachment from the sense of reality towards external objects, comes close to the lack of insight representing the loss of sense of reality of oneself, i.e. the loss of the sense that the symptom related mental events are generated by one’s mind (Aguglia et al., 2002). Furthermore, the present study also found that, there is a significant positive correlation between SUMD2 (awareness of achieved effects of medication) and PANSS-negative symptoms. This finding is in concordance with other earlier studies (Simon et al., 2006; Smith et al., 2000; Kemp and Lambert, 1995). In a study by Mingrone et al. (2013) reported that negative symptoms contributed to two dimensions of insight: awareness of mental illness, awareness of the need for treatment. However other earlier studies didn’t find any correlation between insight and negative symptoms (Monteiro et al., 2008; Amador et al., 1998). A possible explanation for this effect is an etiological theory that considers lack of insight as a negative symptom explains it as “mental withdrawal” from attempting to understand one’s own phenomenological experience of the world (Ostauke et al., 2008). The severity of negative symptoms could increase the difficulty in distinguishing its own subjectivity with respect to the surrounding reality, to recognize a disorder as belonging to his/her own person and to have awareness of the disorder.

V. CONCLUSION

The present study confirms the significant positive relationship between SUMD 2 (awareness of achieved effects of medication) and Positive and Negative symptoms of PANSS. In this study we found a significant negative relationship between SUMD 2 (awareness of achieved effects of medication) and attention and concentration and recent memory, on the subtests of PGI-MS. However the present study didn’t find any significant association between SUMD scores and CTMT and WCST scores.

VI. LIMITATIONS

In the current study the underlying effect of atypical or typical anti psychotic drug was not ruled out which plays a significant role on cognitive function. Sample size was small; particularly the number of female was very small in comparison to the number of male. Hence it is difficult to generalize the findings, especially among women. The present study also lacks randomization of the sample.

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