

Study of various cognitive domains in patients with schizophrenia and their comparison with insight.

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Abstract: Lack of insight in schizophrenia is a debated issue regarding course and outcome of the disorder. Cognitive functions through processing of information helps in assessing the insight, hence cognitive functions are compared with level of Insight to find any correlation. **AIMS and OBJECTIVES:** To study the cognitive functions, level of insight and relationship between cognitive functions and insight in Schizophrenic patients. **MATERIAL AND METHODS:** This is a cross-sectional study to examine the correlation between Cognitive functions and Insight in Schizophrenia. Subjects for the study were recruited from patients (in patients & out patients) attending tertiary care psychiatry Hospital and it was conducted for a period of 1.5 years. Total of 60 patients were selected who have fulfilled ICD-10 criteria of diagnosis for Schizophrenia. **RESULTS:** Other than the memory and fluency domain of the cognitive functions, rest of the domains of cognitive functions as assessed from Addenbrooke's Cognitive Function Scale which include, Attention & Orientation, Language, Visuo-spatial abilities have significant correlation with Insight in Schizophrenia. **DISCUSSION:** We studied both out-patients and in-patients totally numbering 60 subjects. There was good representation of both genders in our sample. We also had a sample that had education and also illiterates. We found that there was a positive correlation between the cognitive functions and insight. We therefore conclude that insight may dependent on cognitive functions.

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I. Introduction

The lack of insight in schizophrenia and other mental disorders has been a much debated issue in the last two decades. The main focus has been on poor insight as a trait of particular mental or nervous illnesses, especially schizophrenia. Eugene Bleuler¹ also, by devoting himself to the psychotherapy of the illness, admitted that schizophrenia patients lacked insight. The International Pilot Study of Schizophrenia (IPSS) found that lack of insight was the most common symptom.² Several studies confirm the fact that 40-60% of people with schizophrenia have partial or no insight.³

These patients appear to deny of having a mental disorder. Literature suggests that poor insight may play an important role in the course and treatment of psychotic disorders, and schizophrenia in particular with poor clinical outcome.⁴ Since poor insight has been considered a part of phenomenology of schizophrenia (Clinical model),^{5,6} and some view that it could be manifestation of reaction to their illness, denying their illness (Psychological denial model)^{7,8,9} and few others have proposed the cognitive deficits (Cognitive deficit model)^{10,11} could be the reason behind poor insight in schizophrenia. Among these studies there were different reports, some say it is part of schizophrenia,^{5,6} some found this could be protecting the patients from suicide and depression^{8,9} and some found that inability to hold information in working memory (cognition)^{10,11} lead to poor insight.

From the above introduction we can see that insight plays a role in course of disorder and accepting the treatment. The cognitive deficits reflect the level of insight, and so we can categorize patients having good cognitive functions and help them in understanding the course of illness and the need to adhere to treatment and help them have good social functions, and cope with depression by cognitive behaviour therapy and insight orientation. But with the patients having poor cognitive functions it may be difficult to educate them with the course of illness so there is a need to develop programmes to improve their cognitive functions. Hence the cognitive functions may be critical in the insight of the psychotic patients, so this study has focussed on the relationship between cognitive functions and insight, so that we can develop tools to improve the cognitive functions.

II. Review of literature

Insight is an essential ingredient of competency for informed consent as well as in criminal proceedings as self-awareness is necessary. Self-awareness and self-reflectivity both are at the very core of the definition of a person: 'a person is an agent who has a sense of self, of his/her own life, which can be evaluated and make choices about it.'¹² Since the time Eugen Bleuler coined the term Schizophrenia in 1908, abnormalities in self-awareness have been thought as being at the core of this prototypical psychotic disorder. It is therefore suggested that lack of insight in psychosis has not only interpersonal, legal and moral implications but as clinicians we also know it is associated with poor clinical outcome⁴, poor medication compliance,¹³ poor social functioning¹⁴ and greater number of hospital admissions.

A modern consensus is that insight is a multidimensional concept.¹⁵ Given the profoundness of the consequences of good or poor insight, it is imperative to understand the process underlying the lack of Insight in Schizophrenia. There are three models of Insight that have been proposed, the Clinical model, the Psychological denial model and the Cognitive deficit model. Among them the cognitive deficit model revealed a strong relationship in several studies.^{16,17,18,19} A range of cognitive tests (Stroop test, Trail making test, Wisconsin card sorting test) have employed to analyse insight in relation to several cognitive functions which indicated role of prefrontal cortex.^{20,21} The cognitive functions help in processing, reasoning of information and contribute to concept formation which contributes to Insight.^{20,21} An alternative formulation of the relationship between insight and the underlying neural substrate potential is that poor insight is related to a broad, generalized cognitive deficit, rather than a specific impairment of, for example, executive function.

Among the three models which explained about insight the Cognitive deficit model²² has been extensively supported. Emil Kraepelin, the first to differentiate schizophrenia from other forms of serious mental illness, had held strongly neurobiological conceptualization of the disorder²³ and is characterised by executive dysfunction. Galin as early as 1974 proposed that Denial of illness was most often seen following right cerebral injuries²⁴ and said that this is reaction to injury but in intact brain with-out injury denial of illness need to be found out.²⁵

Earlier studies found that insight was significantly related to both positive and negative symptoms with approximately equal effect sizes.²⁶ However several such studies have reported a significant inverse relationship between insight and negative symptoms.²⁷ The nature of this relationship is a matter of speculation, which can be explained with patients having more negative symptoms have poor insight because they are liable to accept delusional explanation and apathy, anhedonia will reduce their ability to accept social consequences of the disorder.²⁸ Delusions, uncooperativeness and poor attention predicted 27% of variation in the level of insight in never treated patients, whereas age, duration of illness and symptoms of emotional withdrawal, difficulty in abstract thinking predicted 30.3% of variation in insight of the treated group.

Because of the inconsistent results of the studies above and more studies indicating poor correlation between insight and psychopathology, this study focussed the cognitive functions when the patients are stabilised and receiving the same dose of medication for at least 3 weeks.

The earlier studies comparing insight and cognitive functions yielded inconsistent results. Rosell SL, Coakes J, Shapleske J, assessed insight positive and negative symptoms, cognitive functions and found a relationship between insight and executive function.²⁹ Multiple regression analysis showed that the neurocognitive tests didn't explain any significant portion of observed variance in insight ratings ($p=0.14$). However, insight ratings did correlate significantly with negative symptoms of the PANSS ($P=0.02$), which correlated with the report by Buckley et al that Negative symptoms might thus be a confounding factor for which previous studies have failed to control.³⁰

The neuropsychological view of Insight is that awareness of illness and relabeling of symptoms may be higher order cognitive abilities. Some authors found that executive functions of the patients with poor insight showed increased perseverative responses and poor concept formation (Young et al, Lysaker and Bell). Smith et al reported that overall insight levels were not related to neuropsychological variables but more specifically, symptom misattribution was correlated with card sorting performance. However several studies have failed to demonstrate that poor insight is related to neuropsychological deficits, including card sorting which infers executive function.²⁹

Luiz F L Pegoraro found that working memory correlated positively with awareness of illness in non-deficit schizophrenia and in deficit schizophrenia correlated with negative symptoms, additionally in non-deficit schizophrenia insight correlated with verbal fluency and attention.^{31,32}

Hence most of the above studies say that the cognitive functions are associated with insight, while some say it may be an individual or multidimensional entity and also some say that negative symptoms may be a confounding factor for assessment of cognitive functions, so in this study patients are selected with history of positive symptoms such as delusions and hallucinations.

III. Aims and objectives

1. To study the cognitive functions in Schizophrenic patients.
2. To study the relationship between cognitive functions and insight in these patients.

IV. Materials and methodology

Subjects for the study were recruited from both in-patients and out-patients attending tertiary care psychiatry department over a period of 6 months. Total of 60 patients were selected who have fulfilled ICD-10 criteria of diagnosis for Schizophrenia.

Patients with schizophrenia aged between 19 – 45 years, with duration of illness from 1-5 years and who were stabilised with steady dosage of antipsychotic drugs for a period of at least 3 months prior to the study were taken into the study after obtaining valid written informed consent. And patients with co-morbid neurological disease and substance dependence (other than nicotine) were excluded from the study. This cross-sectional study was done in the department of psychiatry after obtaining clearance from the institutional ethical committee. The patients who were diagnosed to have schizophrenia by ICD-10 criteria by at least two consultant psychiatrists, those who fulfilled the inclusion and exclusion criteria were included in the study. They were evaluated by applying the following instruments a. A proforma of socio-demographic features b. Addenbrooke's cognitive examination scale³³ and c. Schedule for Assessment of Insight.

Addenbrooke's cognitive examination scale:

It was chosen due to its availability and standardized version in local language for both literate and illiterate. Though it is used to assess dementia patients a trial was initially made on few schizophrenia patients and due to its positive outcome, we have considered to apply for the study. It is a brief cognitive test which assesses five cognitive domains namely Attention and Orientation, Memory, Verbal fluency, Language and Visuo-spatial abilities. Total score is 100 higher scores indicate better cognitive function. Administration of the test takes 15 minutes, the cut off value is 82 which gives 84% sensitivity and 100% specificity, hence the individual domains are calculated according to the 82 cut-off score which comes to Attention and Orientation 15, Memory 21, Verbal fluency 11, Language 21, Visuo-spatial abilities 14.³³

Schedule for assessment of insight (SAI):

It was developed by A David. It evaluates insight in three dimensions: 1. The recognition of mental illness, 2. The ability to recognize abnormal mental events as pathological, 3. Treatment compliance. It takes less than 10 minutes to administer it. Scoring: 0-14. To divide the group into two categories as required for the study, those patients who are accepting that they have mental/psychiatric illness often are considered as having insight, which scores 8 on Schedule for assessment of insight and anything less than that is considered as not having insight.

Data analysis: Data was analysed and tabulated with reference to aims and objectives of the study. All statistical analysis was done using Statistical Package for Social Sciences SPSS. Correlation analysis was done between Insight and Cognitive functions and its domains. Majority of the variables were normally distributed.

V. Results

Table 1: shows the socio-demographic characteristics of study subjects

Variable	Group	Number	Percentage
Age distribution	19-35 years	47	78.3%
	36-45 years	13	21.7%
Gender	Male	31	51.6%
	Female	29	48.4%
Marital status	Married	35	58.3%
	Single	22	36.7%
	Separate/Divorced	03	05.0%
Education	Post-graduation	01	01.7%
	Degree	10	16.6%
	Inter	04	06.7%
	ITI	01	01.7%
	1-10	25	41.6%
	Illiterate	19	31.7%
Economic status	Low SES	40	66.6%
	Low Middle	15	25.0%
	Middle	05	08.4%

Table 1 shows the socio-demographic characteristics of study subject and the total sample size was 60 and out of them 31 were males and 29 were females. Majority of the patients were between the age group of 19-35 years (78.3%), married (58.3%), having education below 10th class (73.3%) and from low socio economic status (66.6%).

Table 2: shows the comparison between insight and various cognitive domains of Addenbrooke’s cognitive Examination Scale

Addenbrooke’s cognitive examination scale domains	Insight		p-value
	Present	Absent	
Attention and Orientation			
Score ≥ 15	23	12	<0.005
Score <15	07	18	
Memory			
Score ≥ 21	09	06	>0.005
Score <21	21	24	
Fluency			
Score ≥ 11	07	02	>0.005
Score <11	23	28	
Language			
Score ≥ 21	28	13	<0.005
Score <21	02	17	
Visuo-spatial abilities			
Score ≥ 14	19	08	<0.005
Score <14	11	22	
Total			
Score ≥ 82	17	09	<0.005
Score <82	13	21	

Table 2 shows comparison of domain scores of Addenbrooke’s cognitive examination scale between schizophrenia patients with and without insight as assessed by Schedule for Assessment of Insight. There was statistically significant difference between the two groups on total score, Attention/Orientation domain, Language domain and Visuo-spatial abilities domain.

VI. Discussion

This study was done to assess the cognitive functions in patients with schizophrenia and compare them between the patient groups with and without insight. Totally 60 patients with 30 in each group were taken into the study after assessment of insight and their cognitive functions were assessed.

The observations between the two groups on various domains of cognitive functions as assessed using ACE scale are as follows.

Attention/Orientation domain: It evaluates orientation, registration, attention and concentration. The total score is 18 and a value of 15 and above is considered to have good Attention/Orientation. Around 58.3% of all schizophrenia patients had a score above 15 and out of them 65.7% had insight. About 76% of patients with insight and only 40% of those without insight had a score above 15, which was statistically significant (p value <0.005).

Memory: It evaluates recall, anterograde memory, retrograde memory, recall and recognition. The total score is 26 and the cut off value for this domain is 21 suggesting that patients who score ≥ 21 are considered to have good memory. Overall about 75% of the study subjects (with and without insight) had low scores on memory. There was also no statistically significant difference between the two groups on memory domain.

Fluency: It evaluates verbal fluency and the total score in this domain is 14. The cut off value is 11 and patients scoring ≥ 11 are said to have good fluency. In our study only 15% of total schizophrenia patients had a score above 11 and no significant difference was found between the two groups on fluency domain.

Language: It evaluates comprehension, writing, repetition, naming, comprehension, and reading. The total score is 26 and the cut off value is 21. Patients having scored ≥ 21 are considered to have good language functions. Around 68.3% of total subjects had good language functions and out of them more than 2/3rd had insight. There was significant difference on language score between the two groups.

Visuo-spatial abilities: It evaluates perceptual abilities and the total score is 16. The cut off value is 14 and the patients having ≥ 14 are considered to have good Visuo-spatial abilities. Though only 45% of the study subjects had score above 14, there was significant difference between the two groups.

Total score of ACE: The total score for Addenbrooke's cognitive examination is 100 and the cut off value is 82 which suggest normal cognitive functions. Only 43.3% of study subjects had normal score of above 82 and 2/3rd of them were present in the insight present group.

Our study correlates with the findings of Rosell SL, Coakes J, Shapleske J,²⁹ who found a relationship between insight and executive function which is nothing but measures of memory, learning, language and reasoning. They assessed symptoms of schizophrenia, insight, cognitive performance and brain volume in 78 patients and found that impaired cognitive functions and negative symptoms had significant impact on insight but no relation between brain volume and insight.

Andre Aleman, Edward HF³⁰ investigated insight and measures of working memory in 38 patients with schizophrenia and did not find any significant correlation between working memory and insight, but came to a conclusion that negative symptoms could be a confounding factor. Though our study had significant relationship between insight and cognitive functions, the memory domain part of the ACE scale has no significant relationship, thus our study also reveals the same as above study.

Luiz FL Pegoraro, Clarisssa R dantas³¹ studied aiming at insight dimensions and cognitive functions in deficit and non-deficit patients and found significant correlation between insight and cognitive functions in both groups and in addition the non-deficit group showed another correlation between insight and verbal fluency and attention. We have compared between the groups with and without insight in our study and found significant difference Attention/Orientation and no difference on verbal fluency between the two groups.

Stanley Mutsatsa, Joyce, Hutton³⁴ have examined the nature and clinical correlates of insight in first episode schizophrenia and how these differ from findings in established schizophrenia. Insight clinical symptoms, neurocognitive functions were assessed in 94 patients with first episode schizophrenia and found that poor insight was associated significantly with negative and disorganization symptoms and also working memory. They concluded that there is a complex relationship between insight, positive and negative symptoms, neurocognitive dysfunction, may reflect multidimensional nature of insight.

VII. Conclusions

This study was a cross sectional study which had involved 60 patients suffering from schizophrenia based on ICD-10 diagnostic guidelines. It had represented almost equal number of males and females in the study, most of them coming from rural background, low economic status, most of them are literate. Insight was assessed using Schedule for Assessment of Insight based on the scoring patients have been divided into two groups those having insight and no insight. The Addenbrooke's Cognitive Examination scale was applied to check the cognitive functions and on scoring with 82 cut off value which had 84% sensitivity and 100% specificity patients were divided as having good cognitive functions on scoring 82 and above, poor cognitive functions on scoring less than 82. We have found significant relationship between overall cognitive functioning and its various domains (Attention/Orientation, Language and Visuo-spatial ability) and insight. Based on the above findings we suggest that insight may be dependent on Cognitive functions.

VIII. Limitations

Cultural aspect of the illness and its relationship to insight not accounted for in this study.

This is a simple study not accounting for neuropsychological correlates which would have made it a better study.

Drugs history of the patients which could have an effect on cognitive functions was not taken into account.

Limited sample size

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