

Neuro-Cognition in First Degree Relatives of Patients with Schizophrenia and Mania with Psychotic Symptoms: A Comparative Study

Vikas Kumar¹, Dr. Basudev Das², Dr. Deyashini Lahiri³

¹Clinical Psychologist, Sri Sri University, Cuttack, Odisha.

²Professor of Psychiatry, Central Institute of Psychiatry, Ranchi Jharkhand.

³Assistant Professor of Clinical Psychology, Central Institute of Psychiatry, Ranchi, Jharkhand.

Corresponding Author: Vikas Kumar

ABSTRACT

Non-affective psychosis refers to psychosis not related to emotions or mood. Affective psychosis is a psychological disorder where people experience a loss of contact with reality and experience where mood disturbances are the primary cause. The focus has been shifted to the first degree relatives of these populations to prevent the disorder at the earliest. So, the first degree relatives are known to be high risk population with genetic vulnerability. These two psychotic disorders (schizophrenia & mania with psychotic symptoms) show various impairments in various field but these impairments are present to define these disorders, unaffected relatives of these two disorders for different areas like social, cognitive, neurocognitive and social functioning. Cognitive dysfunction as trait marker nearly established in affective and non- affective population. Aim of this study to assess neurocognition and social functioning in first degree relatives of patients with schizophrenia and mania with psychotic symptoms. Sample consisted of 30 first degree relatives (FDR) of patients with schizophrenia and mania with psychotic symptoms and 15 normal healthy control. After the initial screening by the clinical assessments, based on their amenability for the interview, tool for the assessment of neurocognition (RAVLT, DST, TMT) and socio-occupational functioning (SOFS) were applied on all three groups. The study found that first degree relatives of patients with schizophrenia and mania with psychotic symptoms groups were found higher in reaction time in trail making on measure of neurocognition compared to healthy controls.

Key words: Affective and Non-affective psychosis, FDR, Neurocognition, Social functioning.

INTRODUCTION

Non-affective psychosis refers to psychosis not related to emotions or mood. Schizophrenia and delusional disorders are examples of non-affective psychosis as opposed to bipolar disorder which is an affective psychosis as it involves emotional and mood abnormalities. Affective psychosis is a psychological disorder where people experience a loss of contact with reality and experience where mood disturbances are the primary cause. Affect in the psychological sense refers to a person's emotional state. Various aspects of

these two disorders studied for rehabilitation in the society. Similarly, the focus has been shifted to the first degree relatives of these populations to prevent the disorder at the earliest. So, the first degree relatives are known to be high risk population with genetic vulnerability.

Schizophrenia is a disorder with variable phenotypic expression and poorly understood, complex etiology, involving a major genetic contribution, as well as environmental factors interacting with the genetic susceptibility (Jablensky, 2010). Schizophrenia is a complex and severe

mental disorder, affecting the participant's actions, perceptions, emotions, and cognitive functions (Andreasen, 1997; Gold, 2004). The lifetime prevalence of schizophrenia is approximately 1% (Lewis & Lieberman, 2000; Saha et al., 2005). Very often the illness persists for a lifetime, rendering patients dependent on the public health system. Although the onset of the disease is most common at the end of adolescence or the beginning of adulthood, the etiopathogenesis indicates that genetic predispositions and developmentally early hits, such as social stress, enhance the probability of developing schizophrenia (Rehn & Rees, 2005). The transition into the illness is marked by pathological changes of the brain, such as regional specific losses in gray and white matter (Pantelis et al., 2012).

Bipolar disorder is a lifetime illness which follows a relapsing and remitting course. Manic or depressive episodes relapse in an unpredictable manner. Mania is characterized by a broad array of symptoms including grandiosity, mood lability, decreased need for sleep, and cognitive impairment (Leboyer & Kupfer, 2010); patients may also experience psychotic symptoms, impaired functioning, substance abuse, and anxiety disorders (Judd et al., 2005). During a manic episode, individuals may not perceive that they need treatment, although consequences of poor judgment, hyperactivity, and lack of insight are severe enough to profoundly impair social and professional functioning or to require hospitalisation. These two psychotic disorders show various impairments in various field but these impairments are present to define these disorder, unaffected relatives of these two disorders for different areas like social, cognitive, neurocognitive and social functioning.

Neurocognition can be defined as processes of linking an appraising information. It includes abilities like speed of processing, attention, verbal and visual learning memory, working memory as well as reasoning and problem solving (Nuechterlein, et al., 2004; Roder et al.,

2010). Schizophrenia is characterized by a generalized cognitive impairment, with varying degrees of deficit in all domains, deficits are especially pronounced in the domains of verbal memory, executive functioning and attention and less attenuated in the domains of perceptual- and basic language processes (Sitskoorn et al., 2004; HeinrichsandZakzanis, 1998).

Social functioning:

Social functioning defines an individual's interactions with their environment and the ability to fulfil their role within such environments as work, social activities, and relationships with partners and family. In other words, social functioning defines the ability to establish and maintain relationships with friends and family as well as to undertake work and leisure activities and to cope with day-to-day activities (Bellack et al., 1990). The term social functioning has been used to apply to self- or other report of interpersonal behaviours, behaviour in community settings (e.g., skill ratings while shopping), skills of independent living (e.g., self-care skills, grooming, financial skills, etc.), ratings of social skill in laboratory settings (e.g., role-play tests), and ratings of social problem-solving skills.

First degree relatives in affective and non-affective psychosis:

Genetic or familiar Vulnerability: Healthy first-degree relatives of schizophrenia patients may have impairments in cognition, indicating genetic predisposition to the illness (Sitskoorn et al., 2004a; Kuha et al., 2007). Cognitive dysfunction has been suggested as a trait-marker of schizophrenia. It is observed in chronic, first episode and remitted patients with schizophrenia (Hofer et al., 2011). Also, cognitive deficits are observed before the onset of illness in subjects who are at genetic or clinical high risk for psychosis (ultra-high-risk for psychosis; UHR) (Giuliano et al., 2012).

First Degree Relatives (FDRs) of Schizophrenia and Mania with Psychotic Symptoms:

A first degree relative is a family member who shares about 50 percent of their genes with a particular individual in a family. First degree relatives include parents, offspring, and siblings. In other words, a person's first degree relative is a parent, sibling, or child. A first degree relative shares about half of their genes with the person. Schizophrenia is a major psychiatric disorder with variable phenotypic expression and still it is not thoroughly understood by mental health community; this disorder is marked by very complex etiology which involves myriad genetic contribution, as well as environmental factors interacting with the genetic susceptibility. Multiple genes and different combinations of their polymorphic variant provide the genetic background, with a proportion of the transmitted genotypes remaining clinically unexpressed (Jablensky, 2006). People with schizophrenia experience and develop a wide and diverse array of psychological difficulties reaching for beyond the symptoms of the disease. People often experience very recalcitrant symptoms and longer presence of those symptoms lead to significant reduction in all spheres of their socio-occupational, personal, and intellectual skills. They develop marked impairment in myriad cognitive and intellectual skills and abilities, affect and emotions, interpersonal and social skills, and so on (Penn et al., 2008; Meesters et al., 2010; Figueira&Brissos, 2011).

Neurocognition in First Degree Relatives of Patients with Schizophrenia –

Scala et al. (2012) investigated whether first-degree relatives of patients with schizophrenia were more significantly impaired on executive function tasks (i.e. Wisconsin Card Sorting Test and the Phonemic Verbal fluency) and displayed significantly more severe negative symptoms and poorer social functioning than control subjects. Significant

correlations between neurocognitive measures and negative symptoms were found in the study group, whereas no significant correlations were detected among the controls. Subtle executive impairments, associated with negative symptoms, are shown to be evident in healthy relatives of patients with schizophrenia. These deficits, which reflect subtle dysfunction in concept formation, flexibility and mental shifting, may be seen as potential phenotypic markers of vulnerability for schizophrenia. Wang et al. (2007), examined neurocognitive test performance of first episode schizophrenic patients and their first-degree relatives. They found that schizophrenic patients showed a broad mean of neurocognitive deficits, when compared with their relatives and controls. Their first-degree relatives showed a narrower pattern of poor performance at digit symbol, digit span, trail making, verbal fluency test and WCST-M tests. Thus, findings indicate that selected neurocognitive deficits such as attention and executive function can serve as endophenotypes which may be useful for molecular genetic studies of schizophrenia. The present study confirmed subtle deficits in cognitive, but not emotional ToM in first-degree relatives of schizophrenia patients, which were not explained by global cognitive deficits. Findings corroborate the assumption of distinct social-cognitive abilities as an intermediate phenotype for schizophrenia (Montag et al., 2012). Cognitive deficits found in patients with schizophrenia are also found in non-affected relatives, this finding is consistent with the idea that certain cognitive deficiencies in relatives are caused by familial predisposition to schizophrenia and that these deficiencies might be putative endophenotypes for schizophrenia (Sitskoorn et al., 2004).

Neurocognition in First Degree Relatives of Patients with Mania with Psychotic Symptoms – Bora et al. (2009) was to delineate neuropsychological deficits related to genetic susceptibility, illness process in

bipolar disorder and then first degree relatives. Following an extensive publication search on several databases, meta-analyses were conducted for 18 cognitive variables in studies that compared performances of bipolar disorder patients (45 studies; 1423 subjects) or first-degree relatives of BD patients (17 studies; 443 subjects) with healthy controls. The effect of demographic variables and confounding factors like age of onset, duration of illness and medication status were analysed using the method of meta-regression. While response inhibition, set shifting, executive function, verbal memory and sustained attention deficits were common features for both patient (medium to large effect sizes) and relative groups (small to medium effect sizes), processing speed, visual memory and verbal fluency deficits were only observed in patients.

In a study by Walshe et al. (2012) suggested that being a first-degree relative of an individual with a severe form of bipolar I disorder with psychotic features, indexed from families multiply affected with psychosis, does not confer risk for sustained attention deficits. However, earlier findings of neurocognitive deficits in unaffected relatives of bipolar disorder patients by a small number of studies suggest that further research is needed to clarify the endophenotypic potential of neurocognitive deficits in bipolar disorder.

Social Functioning in First Degree Relatives of Patients with Schizophrenia and Mania with Psychotic Symptoms –

Gkintoni et al. (2017) assessed that cognitive deficits are consistent endophenotypes of schizophrenia and bipolar disorder. In this study they compared adult unaffected first-degree relatives of schizophrenia and bipolar disorder patients on social functioning, cognition, psychopathology and quality of life. The unaffected first-degree relatives of schizophrenia patients group had higher depressive and somatization symptoms while the unaffected first-degree relatives of

bipolar disorder patients group had higher anxiety and lower social functioning compared with the controls. Individuals with superior cognition were more likely to be classified as controls; those with higher social functioning, prolonged processing speed and lower anxiety were more likely to be classified as unaffected first-degree relatives of schizophrenia patients. Hajnal et al. (2013), revealed that impairment of social functioning and difficulties in social integration are frequently found in patients with schizophrenia, and may affect the quality of life, thus revealing that the underlying mechanisms of these differences appear to be of high importance. The impairment of social functioning has been reported in first-degree relatives of schizophrenia patients and individuals at ultra-high risk for psychosis. Two meta-analyses and 15 studies were reviewed, in which various theory of mind tests were performed involving first-degree relatives of patients with schizophrenia, with diverse findings, both positive and negative results have been found.

MATERIALS AND METHODS

This comparative study was approved by the Institutes Ethics Committee. Written informed consent was taken from all the participants before enrolling them for the study.

Design:

This was a comparative study examining the differences in neuro-cognition and social functioning in first degree relative of patients with schizophrenia and mania with psychotic symptoms, and in this study, purposive sampling was used to select the sample.

Participants:

Using purposive sampling, 45 right-handed male and female First degree relatives [15 FDR of patients with first episode schizophrenia, [15 FDR of patients with first episode mania with psychotic symptoms from clinical population diagnosed recent onset as per ICD-10(DCR) criteria), and 15 healthy subjects] were

selected. Healthy controls were screened with the General Health Questionnaire (GHQ)-12); only those with scores <3 were included (Goldberg & Williams, 1988). Additionally, all the participants required a minimum of 8 years of formal education, normal vision and hearing and sufficient mastery in Hindi to undergo the task and in the age group of 18–50 years. Exclusion criteria were a history of neurological illness, significant head injury, substance dependence (excluding nicotine and caffeine), other psychiatric disorders, disruptive behaviour (suicidal or homicidal) that warranted immediate intervention.

Tools used:

Following tools were used in the study. Consent form used to regard the consent for the participation in the current research. *Socio-demographic and clinical data sheet* was designed to collect all details regarding age, sex, education, occupation, marital status, religion, caste, domicile, family income, duration of illness of the patient etc. Additional information about the patient will be taken with the help of institute's case record file of the patient. *The General Health Questionnaire (GHQ 12)* was introduced by Goldberg and Williams in 1988. It is a screening device for identifying minor psychiatric disorders in the general population and within community or non-psychiatric clinical settings such as primary care or general medical out-patients. The self-administered questionnaire focuses on two major areas: a) The inability to carry out normal functions b) The appearance of new and distressing phenomena. *Sidedness Bias Schedule (SBS) (Mandal et al., 1992)* it is used to examine the hand preference (handedness) for a person by ascertaining the preferred hand for some day-to-day activities. *Digit Span test (WAIS-III; Wechsler, 1997a)* used to assess attention and working memory in both clinical and nonclinical populations. *Trail Making Test (Reitan, 1956)* used to assess cognitive processes including attention, visual search and scanning,

sequencing and shifting, psychomotor speed, abstraction, flexibility, ability to execute and modify a plan of action, and ability to maintain two trains of thought simultaneously and this test demands adequate visual scanning, selective attention and cognitive set shifting during an easy task (Lezak, 1983). *Rey's Auditory Verbal Learning Test*, the Indian version where words were translated in four languages but only Hindi and English words were used. *The Social Occupational Functioning Scale (SOFS, Saraswat et al., 2006)* was used to assess in the domains of self-care and activities of daily living, communications and interpersonal relations, instrumental living skills and work.

PROCEDURE:

First degree relatives of patients with schizophrenia and mania with psychotic symptoms have been identified for the study. Written informed consent was taken from all the first degree relatives of patients with schizophrenia and mania with psychotic symptoms. Only in those fulfilling the inclusion criteria were selected for the study. Socio-demographic data was taken from selected participants. Assessment on these first degree relatives was done. Participants from all groups were assessed on tasks of neuro-cognition (digit span test, trail making test and Rey's auditory verbal learning test), and social functioning, (Social and Occupational Functioning Scale (SOFS). Control group (Group 3) who were selected from normal population and were fulfilling inclusion criteria, and those given written informed consent. General Health Questionnaire-12 was applied on normal participants and only those participants were taken who scored less than 3, subsequently they were presented the tools of neurocognition (Digit Span test, Trail Making Test, Rey's Auditory & Verbal Learning Test).

STATISTICAL ANALYSIS:

Appropriate statistics methods were used for analysing the data. The result obtained were analysed by using the

computer software program, Statistical Package for Social Sciences-version 22.0 for Windows. With different parametric measures being used. Description of sample characteristics with descriptive statistics percentage, means and standard deviation.

Group differences for sample characteristics and experimental variables were examined with one-way ANOVA and Chi-square test wherever applicable. Correlation between the variables- Pearson correlation was used.

RESULTS:

Socio demographic variables –

Table – 1.1: Comparison of Socio-Demographic Variables (Continuous) Between First Degree Relatives of Patients with Schizophrenia and Mania with Psychotic Symptoms & Healthy Control Groups (N=45)

Variable Group	FDR of Schizophrenia (n=15) Mean ± SD	FDR of Mania with psychotic symptoms (n=15) Mean ± SD	Healthy Controls (n=15) Mean ± SD	F (df = 42)	p
Age (in years)	38.40 ± 3.54	36.13 ± 7.80	34.60 ± 3.43	1.927	0.158
Family Income (in rupees)	10000.00 ± 3316.62	9333.33 ± 3062.83	12233.33 ± 4450.78	2.778	0.074
Education (in years)	11.33 ± 2.19	10.27 ± 1.66	12.27 ± 2.76	2.959	0.063

FDR = First Degree Relatives,

Table 1.1 shows comparison of age, family income and education (continuous variables) across three groups – first degree relatives of patients with schizophrenia and mania with psychotic symptoms, and healthy controls using one-way ANOVA. The three groups were comparable on these variables. There was no significant difference found between the three groups. In FDR of schizophrenia group, the mean

age was 38.40 years (SD = 3.54) and mania with psychotic symptoms group the mean age was 36.13 years (SD = 7.80). In healthy control group the mean age was 34.60 years (SD = 3.43). Mean family income for schizophrenia group was 10000.00 (SD = 3316.62) and for FDR of mania with psychotic symptoms it was 9333.33 (SD = 3062.83). For healthy controls group it was 12233.33 (SD = 4450.78).

Table -1.2: Comparison of Socio-Demographic Variables (Discrete) Between First Degree Relatives of Patients with Schizophrenia and Mania with Psychotic Symptoms & Healthy Control Groups (N=45)

Variables	FDR of Schizophrenia n (n %) (n=15)	FDR of Mania with psychotic symptoms n (n %) (n=15)	Healthy Controls n (n %) (n=15)	χ ² / Fisher's exact	df	p
Marital Status	Unmarried	0 (0.0%)	2 (13.3%)	4.049 [†]	1	0.762
	Married	15 (100.00%)	13 (86.7 %)			
Religion	Hindu	13 (86.7%)	14(93.3%)	0.549 [†]	1	1.00
	Others	2 (13.3%)	1(6.7%)			
Occupation	Employed	3 (20.0%)	4 (26.7%)	6.754 [†]	2	0.132
	Unemployed	12 (80.0%)	9 (60.0%)			
	Other/Business	0 (0.0%)	2 (13.3%)			
Habitat	Rural	6 (40.0%)	9 (60.0%)	2.340 [†]	1	0.416
	Urban	9 (60.0%)	6 (40.0%)			

FDR = First Degree Relatives, f = Fisher's exact test.

Table 1.2 gives comparative information about socio-demographic characteristics (discrete variables) of experimental and healthy control groups. Discrete variables consisted of marital status, religion, occupation, and habitat. Pearson chi square or Fisher's exact test was used. No significant difference was seen in marital status. It was lower in FDR of mania with psychotic symptoms i.e. 13 (86.7%). In

first degree relatives of patients with schizophrenia group the number of employed people was i.e. 3 (20.0%), in FDR of mania with psychotic symptoms group the number of employed people was same i.e. 4 (26.7%). It was 7 (46.7%) in healthy controls group. The finding suggests that there was no statistically significant difference among three groups.

Experimental Variables:

TABLE – 2.1: Comparison of social occupational functioning in first degree relatives of patients with schizophrenia and mania with psychotic symptoms and healthy control groups (N=45)

Variable	FDR of Schizophrenia (n=15) Mean ± SD	FDR of Mania with psychotic symptoms (n=15) Mean ± SD	Healthy Controls (n=15) Mean ± SD	F (df = 42)	p
SOFS	14.73 ± 1.03	14.73 ± 0.96	14.00 ± 0.00	4.053	0.024

Table 2.1 shows comparison of social occupational functioning between three groups. First degree relatives of patients with schizophrenia group was found to be higher with the mean 14.73 (SD = 1.03) compared to patients with mania with psychotic symptoms and healthy

controls group with the mean of 14.73 (SD = 0.96) and 14 (SD= 0.00). While ANOVA showed significant difference among the three groups, post hoc analysis showed that the difference was not found to be statistically significant between the groups.

TABLE – 2.2: Comparison of Digit Span Test in First Degree Relatives of patients with schizophrenia and mania with psychotic symptoms and healthy control groups (N=45)

Variables	FDR of Schizophrenia (n=15) Mean ± SD	FDR of Mania with psychotic symptoms (n=15) Mean ± SD	Healthy Controls (n=15) Mean ± SD	F (df = 42)	p
Digit Span Test (Forward)	5.33 ± 0.48	5.33 ± 0.61	5.60 ± 0.50	1.217	0.306
Digit Span Test (Backward)	4.27 ± 0.70	4.13 ± 0.74	4.27 ± 0.59	0.190	0.827

Table 2.2 shows comparison of digit span test (forward) between three groups. In first degree relatives of patients with schizophrenia group had a mean of 5.33 (SD = 0.48) and first degree relatives of patients with mania with psychotic symptoms group had a mean of 5.33 (SD = 0.61), compared to healthy controls group with the mean of 5.60 (SD = 1.21). The difference was not found to be statistically significant.

On digit span test (backward), first degree relatives (FDR) of patients with schizophrenia group were found to have a mean of 4.27 (SD = 0.70) and FDR of patients with mania with psychotic symptoms showed of 4.13 (SD= 0.74) compared to healthy controls group with a mean of 4.27 (SD = 0.59). The difference was not statistically significant.

TABLE – 2.3: Comparison of Reaction Time on Trail Making Task in First Degree Relatives of patients with schizophrenia and mania with psychotic symptoms and healthy control groups (N=45)

Variable	FDR of Schizophrenia (A) (n=15) Mean ± SD	FDR of Mania with psychotic symptoms (B) (n=15) Mean ± SD	Healthy Controls (C) (n=15) Mean ± SD	F (df = 42)	Post hoc
Trail – A	29.20 ± 11.97	36.80 ± 18.83	28.07 ± 8.14	1.797	.178
Trail – B	71.40 ± 22.33	64.80 ± 21.03	48.07 ± 10.97	6.130	.005** A>C B>C

**P<.01, Trail – A, B = Trail making part – A & B

Table – 2.3 shows comparison of reaction time on trail making test between three groups. In Trail - A task, the first degree relatives (FDR) of patients with schizophrenia group were found to have a mean of 29.20 (SD = 11.97) and FDR of patients with mania with psychotic symptoms 36.80 (SD = 18.83) respectively, compared to healthy control group with the

mean of 28.07 (SD = 8.146). The difference was found to be not statistically significant.

On Trail - B, the first degree relatives (FDR) of patients with schizophrenia group were found to with the mean of 71.40 (SD = 22.33) and FDR of patients with mania with psychotic symptoms 64.80 (SD = 21.03) respectively, compared to healthy control group with the mean of 48.07 (SD = 10.97). The difference

was found to be statistically significant at .005 level. Post hoc analysis showed that both FDR of patients with schizophrenia and FDR of patients with mania with

psychotic symptoms groups were found to be having higher reaction time compared to healthy controls.

TABLE – 2.4: Comparison of Errors on Trail Making Task in First Degree Relatives of patients with schizophrenia and mania with psychotic symptoms and healthy control groups (N=45)

Variable	FDR of Schizophrenia (A) (n=15) Mean ± SD	FDR of Mania with psychotic symptoms (B) (n=15) Mean ± SD	Healthy Controls (C) (n=15) Mean ± SD	F (df = 42)	p
Error on Trail - A	0.333 ± 0.724	0.133 ± 0.352	0.133 ± 0.516	0.656	.524
Error on Trail - B	0.466 ± 1.125	0.266 ± 0.594	0.333 ± 0.488	0.251	.779

Trail - A & B = Trail making test part A & B, FDR = First Degree Relatives

Table 2.4 shows comparison of errors on trail making tasks between three groups. In trail – A task, first order ToM task the first degree relatives (FDR) of patients with schizophrenia group were found to have a mean of 0.333 (SD=0.724) and FDR of patients with mania with psychotic symptoms 0.133 (SD= 0.352), healthy control group with the mean of 0.133

(SD=0.516). The difference was not statistically significant.

On trail - B, first degree relatives (FDR) of patients with schizophrenia group were found to have a mean of 0.466 (SD = 1.125) and FDR of patients with mania with psychotic symptoms 0.266 (SD = 0.594) compared to healthy controls group with a mean of 0.333 (SD = 0.488). The difference was not statistically significant.

TABLE – 2.5: Comparison of Auditory Verbal Learning Task in First Degree Relatives of patients with schizophrenia and mania with psychotic symptoms and healthy control groups (N=45)

Variables	FDR of Schizophrenia (A) (n=15) Mean ± SD	FDR of Mania with psychotic symptoms (B) (n=15) Mean ± SD	Healthy Controls (C) (n=15) Mean ± SD	F (df = 42)	p	Post hoc
Recall of five trials	55.80 ± 7.96	46.73 ± 9.55	54.00 ± 9.59	4.204	.022*	A>B
Immediate Recall	11.13 ± 1.30	10.60 ± 1.72	11.20 ± 2.54	0.438	.649	
Delay Recall	11.27 ± 1.43	10.40 ± 1.59	11.00 ± 2.50	0.814	.450	
Correct Recognition hits	13.60 ± .73	13.73 ± 1.10	13.93 ± 1.10	0.428	.655	

*p<0.05

Table 2.5 shows that comparison on recall of five trial on Rey’s auditory verbal learning test (RAVLT) the first degree relatives (FDR) of patients with schizophrenia group were found to be with the mean of 55.80 (SD = 7.96) and FDR of patients with mania with psychotic symptoms 46.73 (SD = 9.55) respectively, compared to healthy control group with the mean 54.00 (SD = 9.59). FDR of schizophrenia group and healthy controls showed higher scores than FDR of patients with mania with psychotic symptoms groups. Post hoc analysis showed that FDR of patients with schizophrenia were found higher in total recall compared to FDR of patients with mania with psychotic symptoms group.

Shows that comparison on recall of immediate recall on Rey’s auditory verbal learning test (RAVLT) of the first degree relatives (FDR) of patients with schizophrenia group were found to have a mean 11.13 (SD = 1.30) and FDR of patients with mania with psychotic symptoms 10.60 (SD = 1.72) respectively, compared to healthy control group with the mean 11.20 (SD = 2.54). The difference was not found to be statistically significant.

Shows that comparison on recall of delay recall on Rey’s auditory verbal learning test (RAVLT)of the first degree relatives (FDR) of patients with schizophrenia group were found to with the mean 11.27 (SD = 1.43) and FDR of patients with mania with psychotic

symptoms 10.40 (SD = 1.59) respectively, compared to healthy control group have a mean 11.00 (SD = 2.50). The difference was not found to be statistically significant.

Shows that comparison on correct recognition hits on Rey's auditory verbal learning test (RAVLT) of the first degree relatives (FDR) of patients with schizophrenia group were found to with the mean of 13.60 (SD = .737) and FDR of patients with mania with psychotic symptoms 13.73 (SD = 1.10) respectively, compared to healthy control group with the mean 13.93 (SD = 1.10). The difference was not found to be statistically significant.

TABLE – 3.1: Correlation between Socio-Demographic Variables and Experimental Variables in First Degree Relatives of Patients with Schizophrenia groups:

Variables	Education	Total recall of five trials of RAVLT	SOFS
Age	-0.552*	-0.529*	0.148
Education		0.094	-0.557*
Family Income	0.491	-0.268	0.042

*P < .05, RAVLT = Rey's auditory verbal learning test, SOFS = Social and occupational functioning scale,

Table – 3.1, shows correlation between socio-demographic variables and experimental variables in first degree relatives of schizophrenia. Pearson correlation was used. It was found that there is significant negative correlation between age and education, significant negative correlation between age and total recall of five trials of RAVLT task, significant negative correlation between education and SOFS.

TABLE – 3.2: Correlation between Social Occupational and Functioning Scale and Experimental Variables:

Variables	Total recall of five trials of RAVLT	Trail - A	Trail - B
SOFS	-0.267	-0.192	0.380

SOFS = Social occupational functioning scale, Trail – A, B = Trail Making test part –A, & B, RAVLT = Rey's Auditory Verbal Learning Test

Table – 3.2, shows correlation between Social occupational functioning scale and experimental variables. Pearson correlation was used. It was found that there is no significant correlation between Social occupational and functioning scale and Rey's auditory verbal learning, Trail making, attributional bias.

DISCUSSIONS

Sample characteristics and socio-demographic characteristics: (Table 1.1 and 1.2)

The present study was conducted on 15 first degree relatives (FDR) of patient with schizophrenia, 15 first degree relatives of patient with mania with psychotic symptoms and 15 normal controls with age mean of 18 to 50 years. In the study mean score of age was 38.40±3.54 of FDR of patients with schizophrenia, 36.13±7.80 of FDR of patients with mania with psychotic symptoms and 34.60±3.43 of normal controls. Results show that there is no significant difference between the groups.

In the present study three groups were compared on various sociodemographic and clinical variables like sex, marital status, religion, socioeconomic status, habitat, education, occupation, past history and family history. There was no significant difference found in all these variables. Result reveals that first degree relatives (FDR) of patients with schizophrenia 15 (100.0%) were married, FDR of patients with mania with psychotic symptoms 13 (86.7 %) were married and 2 (13.3%) were unmarried and in the normal controls 14 (93.3 %) were married and 1 (6.7%) individual was unmarried. In first degree relatives of patients with schizophrenia group the number of employed people was i.e. 3 (20.0%), in FDR of patients with mania with psychotic symptoms group the number of employed people was 4 (26.7%). In healthy control it was 7 (46.7%). The finding suggests that there was no statistically significant difference among three groups. Further, the result is showing that 40% FDR of patients with mania schizophrenia are from rural background whereas in FDR of patients with mania group it is 60 % but in healthy control it is 33.3%. This was also not statistically significant. Being a Government Tertiary Hospital majority of patients attend the services belong to families hailing from rural habitat, so the finding of the study. Similar finding was observed by Srinivasan

and Thara, (1997) that 80% patients with schizophrenia come from rural background. In the present study mean of family income of first degree relatives of schizophrenia was 10000.00 (SD = 3316.62) and for FDR of mania with psychotic symptoms it was 9333.33 (SD = 3062.83). For healthy controls group it was 12233.33 (SD = 4450.78). There was no significant difference found between the three groups. The reason of not having any significant difference on sociodemographic variables could be attributed to the careful selection of sample or in other words it can be said that samples were well matched for the present study. However, some well-matched studies also observed no differences between relatives and controls (Erol et al., 2010; Surguladze et al., 2012).

Social Occupational Functioning in First Degree Relatives: (Table – 2.1) –

The present study shows no statistically significant difference in social functioning between first degree relatives (FDR) of patients with schizophrenia and mania with psychotic symptoms, and when compared with healthy normal controls. In this study first degree relatives of patients with schizophrenia group was found to be higher with the mean 14.73 (SD = 1.03) compared to mania with psychotic symptoms and healthy control group with the mean of 14.00. Previous study (Gkintoni et al. 2017) finding revealed mixed findings related to social functioning in first degree relatives of both group. The unaffected first-degree relatives of schizophrenia patients group had higher social functioning while the unaffected first-degree relatives of bipolar disorder patients group had lower social functioning compared with the controls. Individuals with superior cognition were more likely to be classified as controls; those with higher social functioning, prolonged processing speed and lower anxiety were more likely to be classified as unaffected first-degree relatives of schizophrenia patients.

Neurocognition in First Degree Relatives: (Table: 2.2, to 2.5)

In the present study first degree relatives of patients with schizophrenia group was found to have mean of 5.33 (SD = 0.48) and first degree relatives of patients with mania with psychotic symptoms group was found to have mean of 5.33 (SD = 0.61), compared to healthy controls group with the mean of 5.60 (SD = 1.21). The difference was not statistically significant. A meta-analysis (Egan, et al., 2001) conducted in first-degree relatives showed worse performance in all cognitive domains studied, compared with controls. Effect sizes, however, were small, but significant in domain. This suggests that these cognitive functions like executive functioning and verbal memory may be trait markers for the genetic liability for bipolar disorder. Heterogeneity between the results of the different studies may be due to the small number of studies with relatively small, heterogeneous groups of first-degree relatives with different family histories. Sobczak et al. (2003) found more pronounced cognitive impairments in first-degree relatives of bipolar I patients compared with relatives of bipolar II patients. Another possible source of heterogeneity is the fact that only a small number of studies controlled for subclinical mood symptoms in first-degree relatives and controls. Study showing robust cognitive deficits are present and familial in schizophrenia and psychotic bipolar disorder. Severity of cognitive impairments across psychotic disorders was consistent with a continuum model, in which more prominent affective features and less enduring psychosis were associated with less cognitive impairment. Cognitive dysfunction in first-degree relatives is more closely related to psychosis-spectrum personality disorder traits in psychotic bipolar disorder than in schizophrenia (Hill et al., 2013).

In Trail making task-A, the first degree relatives (FDR) of patients with schizophrenia group were found to be with the mean of 29.20 (SD = 11.97) and FDR of patients with mania with psychotic

symptoms 36.80 (SD = 18.83) and healthy control group with the mean of 28.07 (SD = 8.14). On Trail - B, the first degree relatives (FDR) of patients with schizophrenia group were found to be with the mean of 71.40 (SD = 22.33) and FDR of patients with mania with psychotic symptoms 64.80 (SD = 21.038) and healthy control group with the mean of 48.07 (SD = 10.977). FDR of schizophrenia and FDR of mania with psychotic symptoms groups were found higher in reaction time compared to healthy controls. The difference was found to be statistically significant at .005 level. Study considered this test as measure of attention and executive function which are candidate of bipolar endophenotypes (Arts et al., 2008). Similarly, Wang et al. (2007) examined neurocognitive test performance of first episode schizophrenic patients and their first-degree relatives. They found that schizophrenic patients showed a broad mean of neurocognitive deficits, when compared with their relatives and controls. Their first-degree relatives showed a narrower pattern of poor performance at Trail Making along with other tests. Thus, findings indicate that selected neurocognitive deficits such as attention and executive function can serve as endophenotypes which may be useful for molecular genetic studies of schizophrenia. So, the similar findings were there in our study.

In the present study, the comparison on recall of five trials on Rey's auditory verbal learning test (RAVLT) as measure of verbal learning and memory of the first degree relatives (FDR) of patients with schizophrenia group were found to be 55.80 (SD = 7.96) and FDR of patients with mania with psychotic symptoms 46.73 (SD = 9.55) while healthy control group was with the mean of 54.00 (SD = 9.59). FDR of patients with schizophrenia and FDR of mania with psychotic symptoms groups were found to be lower in recall on five trials compared to healthy controls. In domains of immediate recall on Rey's auditory verbal learning test (RAVLT) of the first degree relatives (FDR) of patients with schizophrenia group were

found to have mean of 11.13 (SD = 1.30) and FDR of patients with mania with psychotic symptoms 10.60 (SD = 1.72) and healthy control group with the mean of 11.20 (SD = 2.54). FDR of patients with schizophrenia and FDR of patients with mania with psychotic symptoms groups were found lower in immediate recall compared to healthy controls and of delayed recall on Rey's auditory verbal learning test (RAVLT) of the first degree relatives (FDR) of patients with schizophrenia group with the mean of 11.27 (SD = 1.43) and FDR of patients with mania with psychotic symptoms 10.40 (SD = 1.59) and healthy control group with the mean of 11.00 (SD = 2.50). FDR of patients with schizophrenia groups were higher and FDR of patients with mania with psychotic symptoms groups were lower in delayed recall compared to healthy controls. The differences were not found to be statistically significant. The results also compared on correct recognition hits on Rey's auditory verbal learning test (RAVLT) of the first degree relatives (FDR) of patients with schizophrenia with the mean of 13.60 (SD = 0.73) and FDR of patients with mania with psychotic symptoms 13.73 (SD = 1.10) and healthy control group with the mean of 13.93 (SD = 1.10). FDR of patients with schizophrenia and FDR of patients with mania with psychotic symptoms groups were found lower in correct recognition hits compared to healthy controls. The difference was not found to be statistically significant.

In this study of the cognitive functioning of first degree relatives of patients with schizophrenic, and mania with psychotic symptoms relatives performed equal or similar to the control subjects on tests of auditory verbal learning test. Each of these tests contributed unique variance to the discrimination between groups but performance did not differ significantly between groups. This study observed that FDR of patients with schizophrenia and FDR of patients with mania with psychotic symptoms groups were found higher in

reaction time on trail making test compared to healthy controls. The difference was found to be statistically significant at .005 level. There is also evidence for shared endophenotypes in BD and schizophrenia. Verbal memory and processing of speed or set shifting impairments are observed in relatives of both patient groups. Wood and colleagues recently examined progressive changes in cognitive function over the transition to psychosis as part of the high risk studies (Wood et al., 2007). While performance on most tests was stable or improved but, visuospatial memory, verbal fluency and attention switching showed significant decline over the transition to psychosis. These progressive impairments were not seen in the non-psychotic high risk group. This study provides evidence that cognitive deficits are present in the small to medium effect size mean in unaffected adult first-degree relatives of schizophrenia patients and mania with psychotic patients. So, the finding of our study is not exceptional as it also shows impairment in some domains of neurocognition like attention and visuospatial ability measured by trail making task.

Correlation between Socio-Demographic Variable and Experimental Variables in First Degree Relatives of Patients with Mania with Psychotic Symptoms and FDR of patients with schizophrenia Groups: (Table: 3.1 & 3.2) –

The present study also shows the relationship between neurocognition and social functioning with sociodemographic and clinical variables in first degree relatives (FDR) of patients with mania with psychotic symptoms and FDR of patients with schizophrenia. There was positive significant correlation between age and Rey's auditory verbal learning test. The finding reveals the positive correlation between age and total recall of five trials on Rey's auditory verbal learning test (RAVLT) in FDR of patients with mania with psychotic symptoms (table - 3.1), and also found negative correlation between

family income and first order theory of mind, education and social occupational functioning scale in FDR of patients with schizophrenia (table – 3.2). The RAVLT is a very efficient neuropsychological instrument for assessing episodic declarative memory. The test allows the evaluation of the components of acquisition and recall of information and permits the investigation of separate memory processes (Mitrushina et al., 2005). Consistent with previous studies (Malloy-Diniz et al., 2007), the data indicate that age was the main factor that influenced RAVLT performance, favouring elder FDR and higher family income related to participants ($p < .05$). The present study showed the negative correlation between ToM and family income ($p < .05$) which indicates that first degree relatives' family background makes a strong contribution to the development of their cognition, in particular, to their understanding of false-belief. This is in addition to, and independent of, the contributions of language and age. Negative correlation between social and occupational functioning (SOFS) and education in FDR of schizophrenia ($p < .05$) was also found from the study. It was also found the negative correlation between time taken of trail making Part-B and second order theory of mind. It was also found that there is negative correlation between Rey auditory verbal learning test and external bias and also found that there is negative correlation between trails making second order theory of mind in FDR of patients with mania with psychotic symptoms.

CONCLUSION

The present study is an attempt to a better understanding of neurocognition and socio-occupational functioning in first degree relatives (FDR) of patients with schizophrenia and mania with psychotic symptoms. The socio-demographic variables were matched, and this study reveals that the first-degree relatives of people with schizophrenia show moderate difficulties in some domains of

neurocognition, and the overall results are thus consistent with the hypothesis of an endophenotypic role of neurocognition impairments in FDRs of patients with schizophrenia and mania with psychotic symptoms.

Limitations:

In the present study have some limitations. The sample size was modest and small, which made it difficult to generalize the results. There was a gender difference; more male participants could have been included. There was difference in occupational status in first degree relatives and normal controls. Most of the participants were from low socio economic status and rural habitat, where the normal control from urban and middle socio economic status.

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