



## **A Study of the Relationship Between Neurocognitive Functioning, Coping Style and Personality Factors in Schizophrenia Patients**

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**Abstract**

*The present study examined the relationship between Neurocognitive Functioning, Coping Style and Personality Factors in Schizophrenia Patients who are currently in remission. Evaluation of areas of neurocognition, personality and coping could give important information to develop programmes that would contribute to improve the person's coping strategy. The sample was selected on the basis of purposive sampling method. The study was done in 30 patients living with schizophrenia. Tower of London, Wechsler memory scale-III subtests: word list I and II and visual reproduction I and II were used for assessing the neurocognitive function. NEO-FFI was used to assess the personality, Ways of Coping Questionnaire was used to identify the coping style and Mini-International Neuropsychiatric Interview (M.I.N.I) was used to screen the patients for any comorbid conditions. The variables used in this study do not follow normal distribution. Hence nonparametric test such as Spearman Rank Correlation Test is used to analyse the relationship between the variables.*

*The results showed that independent of personality, neurocognitive functioning and coping style have a significant relationship between them. Conversely, Independent of Neurocognitive functioning, there is a significant relationship between coping style and personality was found, whereas, neurocognitive functioning and coping style did not have a significant relationship between them.*

*The study results suggest that personality factors and neurocognitive deficits cause people to use avoidant coping strategies rather than problem-focused strategies. The coping style and the personality factors might be considered as vital sources of information for mental health professionals for developing appropriate rehabilitation programmers.*

## **Introduction**

Schizophrenia is a severe mental disorder affecting more than 21 million people worldwide (WHO). Studies provide evidence that the prevalence of risk for schizophrenia is between 1.5 and 7 per thousand populations.(Viswanath B,Chaturvedi S. K.,2012). World Health Organization (2013) has ranked schizophrenia as the third most disabling illness globally among adolescents to middle aged people.It ranks among the top 10 causes of disability in developed countries worldwide. It influences how a person considers, feels, and acts. Individuals with schizophrenia may appear like they have lost touch with reality.

## **History of Schizophrenia**

Historically, schizophrenia is mentioned as madness in prehistoric texts such as the Hindu Ayurveda and the Old and New Testament in the bible. (Naqvi,2008). A more understanding of this condition emerged in the early 19th century. The condition was described by Haslam in detailed in 1810, a druggist in Bethlehem hospital. Although the first use of the term Dementia Precocecan is credited to French psychiatrist Benedict Morel, he used the term to describe deteriorated patients whose illness began in adolescence.

Krapelin differentiated major psychiatric illness in to two clinical types: Dementia precox and manic depressive psychosis. He translated Morel’s demence precoce into Dementia (change in cognition) Precox(early onset of the disorder). Dementia precox includes long term deteriorating course and the clinical symptoms of hallucinations and delusions (Kraepelin E. 1971)

Bleuler coined the term —” schizophrenia”. It is derived from the German word —”schizien” to split. He used the word schizophrenia to refer to what he called a weakening of the link between the various entities of the mind. This led to the thoughts becoming detached and to the reduced synchronization between affective, thinking and the behavioural processes. In order to identify the most fundamental aspect of its presentation, Bleuler focused primarily on signs and symptoms rather than on course and outcome. He identified 4 specific fundamental symptoms of schizophrenia to develop his theory about the internal mental schisms of the patients. (Blueler E. 1950)

Gradually, the field became focused on reality distortion symptoms and moved further away from Kraepelin’s initial avolition/ dissociation concept. After that Kurt Schneider he developed diagnostic system for schizophrenia. His work has been especially important at the operational level of diagnosis. (Schneider K. 1959)

## **Schizophrenia Prevalence and Incidence**

The distribution of a disorder in a given population is measured in terms of incidence and prevalence. Incidence refers to the proportion of new cases per unit of time (usually one year), while prevalence refers to the proportion of existing cases (both old and new).

A large number of research literatures have appraised the prevalence of schizophrenia. Despite the fact that there are operational and practical changes, most studies indicate a point prevalence risk for schizophrenia as falling in between the range of 1.5 and 7 per thousand populations. Viswanath B(2012), in his review that included a meta-examination of 188 reviews from 46 nations, assessed the middle lifetime commonness as 4.0. The study also reported that the prevalence of schizophrenia was found to be higher in developed and developing countries when compared to least developed countries. Indian studies have reported that ‘the prevalence of schizophrenia is lower in India when compared to the West’ (Math, Chandrasekar&Bhugra, 2007).

**Incidence:** The incidence rate of schizophrenia can be compared across cultures. In light of whether a tight or expansive definition is utilized there will be certain differences observed. The International Classification of Diseases (ICD)-8, ICD-9 have used a broad definition of schizophrenia and have found the incidence rates to fall between the ranges 0.17 and 0.54 per thousand populations, whereas ICD-10, Diagnostic and Statistical manual of Mental disorders DSM-III, that have used a narrow definition of schizophrenia have found the incidence rates to be much lower. The WHO conducted a study across 10 countries (DOSMED–Determinants of Outcome of Severe Mental Disorders). It was a diverse epidemiological review gone for deciding the rate of schizophrenia in different societies. The frequency rate in the wide demonstrative gathering was found to be 0.15-0.42 per 1000 and there were significant different across the different areas. The incidence rate for the narrow diagnostic group was 0.07-0.14 per thousand and the difference across areas was non-significant (Viswanath B, Chaturvedi S. K. 2012).

## **Schizophrenia and Psychopathology**

In schizophrenia, the presentation of symptoms is found to be in a varied and mixed manner both in individual patients and over the course of the illness. Cross sectional and the longitudinal analysis of schizophrenic symptoms have led to conceptualization of two replicable psychopathological domains of symptoms, positive and negative symptoms. Manifestations of schizophrenia for the most part begin between ages 16 and 30.

Historically the neurologist Hughlings Jackson, in his conceptualization neurological organic brain disease, first used the term positive and negative symptom. Timothy Crow, he applied the concept to schizophrenia and described Type 1 and type II schizophrenia, which consider as dichotomous syndrome with relatively independent underlying pathophysiological processes (Andreasen and Olsen, 1982). Andreasen and Olsen (1985) expanded the syndromal concept of schizophrenia by contributing definitive psychopathological description of two domains. They suggested that two distinct categories can be used to classify patients with positive symptom and patients with negative symptom. (Andreasen NC, Olsen, 1985). Latter Andreasen and his colleagues suggested a grouping of symptoms into three domains 1. Positive or psychotic cluster 2. Negative cluster 3. disorganization cluster.

After that Lindenmayer and his colleagues (1994) proposed a five factor model- positive factors, negative factor, an excitement factor, a cognitive factor and a depressive/ anxiety factor.

“Positive” symptoms are excess of or distortion of normal function. It is insane practices not by and large observed in sound individuals. Two sort of positive side effects are available one is reality bending and another is disruption. Individuals with positive indications may —lose touch with a few parts of reality. Indications include: Hallucinations, Delusions, Thought issue (strange or useless methods for considering), Movement issue (fomented body developments).

Negative symptoms are not only associated with much of the impairment of function but also causes much of that impairment. —Negative symptoms are associated with disruptions to normal emotions and behaviors. Symptoms include: —Flat affect (reduced expression of emotions via facial expression or voice tone), reduced feelings of pleasure in everyday life, difficulty beginning and sustaining activities, reduced speaking.

### **Schizophrenia criteria according to ICD-10**

- A) Thought resound, thought addition or withdrawal, and thought broadcasting.
- B) Delusions of control, impact, or inactivity, obviously alluded to body or appendage developments or particular contemplations, activities, or sensations; hallucinating recognition;
- C) Hallucinatory voices giving a running editorial on the patient's conduct, or talking about the patient among themselves, or different sorts of hallucinatory voices originating from some piece of the body.
- D) Determined hallucinations of different sorts that are socially improper and totally inconceivable, for example, religious or political character, or superhuman forces and

capacities (e.g. Having the capacity to control the climate, or being in correspondence with outsiders from a different universe).

- E) Persistent mind flights in any methodology, when joined either by short lived or half-framed daydreams without clear full of feeling substance, or by tenacious over-esteemed thoughts, or while happening each day for quite a long time or months on end.
- F) Catatonic conduct, for example, fervor, posing, or waxy adaptability, negativism, mutism, and trance.
- G) "Negative" indications, for example, stamped detachment, scarcity of discourse, and blunting or ambiguity of passionate reactions, for the most part bringing about social withdrawal and bringing down of social execution; it must be certain that these are not because of misery or to neuroleptic drug;
- H) A huge and steady change in the general nature of a few parts of individual conduct, show as loss of intrigue, aimlessness, inertness, a self-consumed demeanor, and social withdrawal.

### **Schizophrenia and Cognition**

Cognition is what helps one to negotiate to survive and flourish in the world around as. Cognition is the ability to perception, thinking, planning, attend to stimuli, filter out unnecessary stimuli, remember new information, engage in social interaction and perform much high order thought process. In other words cognition is critical for successful living in all its aspects.

#### **Definitions of Cognition:**

American psychological association defines cognition as process of knowing, including attending, remembering and reason; also the content of the process, such as concepts and memory.

Campbell's psychiatric dictionary (2009) says, among the specific functions that maybe assessed in determining adequacy and intactness of cognition are orientation, new learning

ability, problem solving, abstract thinking, reasoning and judgment, ability to retain and recall events, mathematical ability and symbol manipulation, control over primitive reactions and behavior, comprehension and language use, attention, perception and praxis.

Historically Krapelin identified cognitive impairment long back in schizophrenia, dementia praecox means cognitive decline in early onset. He again emphasized two things fundamental to schizophrenia, a general decay of mental efficiency and a failure of executive functioning. According to him —To a considerable degree the mental efficiency is reduced. The patients are unfocused and distractive. They

are unable to store the thought in their mind. Bleuler again noted cognitive changes. He felt the cognitive impairment forms core of schizophrenia and symptoms are secondary to cognitive dysfunction (Kraepelin,1971).

### **Cognitive Functions in Schizophrenia**

Neurocognitive impairment is not simply due to the symptoms but it is the main feature of the illness and DSM IV TR includes in their description of the cognitive dysfunction of the disorder about seven references seven references. (APA,2000). Even before the onset of psychosis ,neurocognitive impairment was found to be present in a mild form and and in patients who have experienced first episode before treatment inhibition ,it was found to be in the severe form.;though a slight improvement with therapy, cognitive impairment is remarkably consistent, even in the presence of positive and negative symptoms change.

A gathering of scientists who chipped away at the neurocognition subcommittee for the Measurement And Treatment Research To Improve Cognition In Schizophrenia (MATRICS) recommended that the most key zones of subjective debilitation in schizophrenia incorporates the working memory, consideration/carefulness, verbal learning and memory, visual learning and memory, thinking and critical thinking, speed of handling, and social cognition.(Green et al 2004).

In schizophrenia, cognitive deficits are now found to a cardinal feature. Even before the onset of the positive symptoms which is a part of the illness, deficits ranging from moderate to severe are observed in certain domains of cognition which can be detected at the time of the first episode. This observation of the cognitive deficits have prompted some researchers to state that schizophrenia is a disease with a global profile of neuropsychological impairment (Bowie and Harvey,2006).

In schizophrenia, a background of generalized impairment in intelligence, (I.Q is generally lower than expected), with poor performance on attention, memory, abstract thinking, spatial working memory, and executive functions characterize the deficit in cognitive function. These cognitive impairments are found to exist when the illness starts, continue to persist despite appropriate clinical treatment and are not found to be the consequence of affective or motivational problems.

### **Memory**

Memory in schizophrenic patients according to Kraepelin, is comparatively little disordered. This view was also supported by Bleuler who stated that memory is not affected in this disease. Researches classified two types of long-term memory, declarative memory and non-declarative memory, characterized by several key differences. Declarative memory (explicit memory) is memory of facts

and events, and refers to those memories that can be consciously recalled. It encompasses both episodic memory (memory for events) and semantic memory (memory for facts). Non-declarative memory (implicit/procedural) is the unconscious memory of skills and how to do things, particularly the use of objects or movements of the body, such as tying a shoelace, playing a guitar or riding a bike. Declarative memory is found to be impaired in schizophrenia. The development of skills in which the strategy of execution cannot be explicitly described can be defined as procedural learning or learning by doing. In tasks related to procedural learning, schizophrenia patients showed near perfect performance or only mild impairment (Reichenberg, 2010).

It was found that the patients showed deficit in both encoding and retrieval (Reichenberg, 2010).

### **Verbal Learning Memory**

Memory function includes the skills to acquire novel knowledge, remembering or holding recently learned material over a temporal period and being able to identify earlier presented data. It was seen that patients generally show greater impairments in learning than in retention. To measure learning the tests used usually include the skill to comprehend lists of words or written passages (Aleman et al, 1999). Severe verbal memory impairments in schizophrenia is supported by evidence based studies. Between verbal memory impairments and social deficits in patients with schizophrenia a clear connection is seen (McClure et al, 2007).

### **Visual Learning Memory**

‘Compared to verbal memory visual learning memory is generally found to be less impaired’. (Heinrichs and Zakzanis, 1998). ‘Patients with schizophrenia have deficit in the visual memory area and with the duration of illness there is a decline in the visual memory functions’. (Seidman and Lanka, 2003).

### **Executive Functions**

The word executive functions is used to refer to a group of advanced cognitive tasks of the prefrontal cortex, and it is also known as frontal-lobe functions. Executive functions ultimately result in purposeful, goal-directed behavior. Executive functioning refers to planning, problem solving, shifting cognitive sets and altering between two or more tasks. Executive functions is composed of five main mechanisms: temporal coding, task management, inhibition planning, monitoring and attention.

In response to changing cognitive or environmental contexts, executive functions points out different types of advanced cognitive processes that allow the malleable revision of thought and behavior. In a

number of studies the tendency toward inflexible thinking is found is highly associated with occupational difficulties (Lysaker et al 1995). Planning, another component of executive functioning is often found to be impaired in schizophrenia. Schizophrenic patients appear to have trouble in framing tactics, starting them, and compliantly altering a plan once it is no longer operative; they also have trouble in efficiently using feedback. Patient with chronic schizophrenia display markedly impaired attention set shifting on the tasks(Bowie and Harvey,2006).

Executive functioning deficits are exhibited by schizophrenic patients and treatment-refractory symptoms like negative symptoms, poor functional outcome are associated with these deficits. (Kerns et al. 2008)

### **Cognition and Coping**

‘The conscious and unconscious psychic mechanisms, which individuals apply to deal with stress in adaptive ways’ is defined as coping by Lazarus (1996). Cognitive, emotional, behavioral, and physiological reaction are included in the coping processes. At the point when the likelihood to comprehend the circumstance utilizing aptitudes is surpassed by intense or perpetual anxiety, the coping mechanisms are triggered (Cohen, Kessler and Gordon 1995). Flexible and efficient contributes to adaptive coping, while rigid or socially inappropriate contributes to maladaptive coping (Lazarus 1996). The particular types of coping strategies have been efficient in the past tend to be repeated again. Thus, each person forms or shapes his or her own “coping style”. It is understood as a trait and becomes a part of his or her personality. (Lazarus 2006).

To oversee and beat troublesome life occasions, incorporating endeavoring with emotional sickness, individuals use many coping mechanisms (Holubova et al. 2015). The current models of psychosis give importance to the concept of coping. Predominately maladaptive coping strategies is used by people with psychotic disorders (Kommacher et al. 2016)

Cognitive impairments affect coping at the level of style, notwithstanding trading off the capacity to react to individual issues. ‘The ability to effectively appraise and think about stressors is negatively impacted by cognitive deficits (Perm et al. 1993; Corrigan and Toomey 1995)and as result a coping style of resignation and avoidance results as a consequence’.(Lysaker et al.2004)

Pallanti et al. (1997) reported that in the absence of external stressors persons with schizophrenia who relapsed showed more broken non-issue centered adapting systems and had more subjective grumblings about comprehension. Objective and subjective measures of weaknesses in consideration were identified with poorer critical thinking, uplifted shirking, and less help-chasing adapting

methodologies when factor analysis was performed on a combined depression and schizophrenia group by Van den Bosch and Rombouts (1997). Poorer performance on a measure of sustained attention was found to predict less psychologically situated critical thinking systems (Ventura et al. 1999).

### **Cognition and Personality**

Identity measurements speak to transiently steady (Von Dras and Siegler 1997) hereditarily impacted (Jang et al. 1996) covariation among an example of interrelated qualities (McCrae and Costa 1997).

The hypothesis of individual contrasts begun from the idea of demeanor proposed by Hippocrates and Galen. Hippocrates' four humors offered ascend to four temperaments. The clarification was additionally refined by his successor Galen amid the second century CE. The "Four Humors" hypothesis held that a man's demeanor depended on the adjust of real humors; yellow bile, dark bile, mucus, and blood. Choleric individuals were portrayed as having an abundance of yellow bile, making them peevish. Elevated amounts of dark bile were held to instigate despairing, connoted by a dismal, melancholy, critical viewpoint. Impassive individuals were thought to have an overabundance of mucus, prompting their drowsy, quiet dispositions. At last, individuals thought to have abnormal amounts of blood were said to be cheery and were described by their merry, enthusiastic attitudes (Carlson et al. 2010)

Contemporary reviews affirm early perceptions (Bleuler, 1911/1950; Kraepelin, 1919/1989) that identities of people with schizophrenia vary from those without schizophrenia, even before maniacal indications show up. Patients report being more contemplative and masochist than psychiatrically solid subjects (Berenbaum and Fujita, 1994), and people who later show schizophrenia are more independent, socially pulled back, and socially awkward than the individuals who don't. One extensive imminent investigation of Swedish armed force initiates found that behavioral lists of neuroticism and introspection were related with ensuing psychosis (Malmberg et al, 1998). In another vast review higher neuroticism and extraversion at age 16 years were related with expanded and diminished hazard, separately, for creating schizophrenia by age 43 years (van Os and Jones, 2001). A current imminent investigation of Finnish recruits found that high neuroticism anticipated future schizophrenia onset, though high extraversion anticipated future bipolar issue (Lonnqvist et al, 2009). Identity issue are 3 times more common in people with psychosis (McMillan et al, 2009), schizophrenia patients are 8 times more probable than non-psychiatric subjects to screen constructive for identity issue (Moore et al, 2012), and first scene schizophrenia patients score higher than sound controls for all identity issue (Keshavan et al, 2005).

To date, one model of identity that has demonstrated some guarantee in serving to efficiently record the sorts of individual contrasts that help or obstruct result in schizophrenia, is the "Five variable" model (McCrae and Costa 1997). This model sets five endogenous characteristics (Jang, Livesley and Vernon 1996) along which all people change, paying little mind to their financial status or culture and which apply a continuing effect on conduct, influence and comprehension over the life expectancy (Von Dras and Siegler 1997). These five measurements are Neuroticism, or powerlessness to enthusiastic flimsiness and hesitance, Extraversion, or the propensity to be warm and active; Openness, or the psychological mien to innovativeness and feel; Agreeableness, or the inclination to be alright with social communications, and Conscientiousness, or the propensity towards loyalty and capability (McCrae and Costa 1997). Each of these measurements is conceptualized as an "essential propensity" which associates with outside impacts to shape how people adjust and frame their self-idea.

Past its natural interest as a model for understanding individual contrasts in schizophrenia, look into has recommended that the qualities of the five element model can be distinguished in schizophrenia (Gurrera, Nestor and O'Donnel 2000) and that, as in the all inclusive community, these characteristics are moderately steady after some time ( Kentros et al. 1997). Moreover, people with schizophrenia tend to give an alternate example of these qualities, underwriting larger amounts of Neuroticism and lower levels of Extraversion, Openness, Agreeableness and Conscientiousness than group controls (Gurrera, Nestor and O'Donnel 2000 ; Lysaker et al. 2003).

Adjusted comprehension and identity seem to develop pair and antagonistically influence result in schizophrenia, yet little research has been done to decide if these are connected or autonomous spaces (Gurrera et al.2005).Personality brokenness in schizophrenia might be interceded by infection related changes in intellectual operations, or the neural procedures basic them. (Gurrera et al.2005). Identity variations from the norm and neurocognitive shortages exist together and are related with the same utilitarian results in schizophrenia. Identity components may represent epiphenomena of neurocognitive impedances, and may add to a corruption in social working as an optional impact (Ronald et al. 2014).

## **Remission**

Remission was defined through the application The Positive and Negative Syndrome Scale (PANSS) (Kay et al, 1987; Lindström et al, 1994), a structured clinical interview for schizophrenia, whereby eight chosen items, representing core symptoms diagnostically characteristic for the condition (delusions, unusual thought content, hallucinatory behavior, conceptual disorganization,

mannerism/posturing, blunted affect, passive/apathetic social withdrawal, lack of spontaneity and flow of conversation), should be reduced to such an extent (a value not exceeding 3 points out of maximum 7 points) as to be solely regarded as mild without affecting the individual's level of functioning (Andreasen et al, 2005; Helldin et al, 2007).

### **Need of the study**

Only coping as a single dimension was assessed in previous studies. This did not give sufficient information about how cognition may be related to the various domains of coping.(Lysaker et.al.,2004).

Schizophrenia outcome is adversely affected by cognition and personality and they appear to change, yet whether these are related or independent domains have been determined by only few studies.(Gurrea et al.,2005)

Hence, this study was an effort to understand the effect of cognitive deficits of schizophrenia patients on their personality and coping. The current study examine the correlations between three forms of higher order neurocognitive functioning of schizophrenia patients' visual memory, verbal memory, and executive function; various domains of coping; and five personality factors, extroversion, neuroticism, openness, conscientiousness and agreeableness.

### **Methodology**

#### **Aim:**

To study the effect of neurocognitive deficit on coping style and personality factors in schizophrenia remission patients.

#### **Objectives**

- To evaluate the relationship between neurocognitive deficit and coping style
- To evaluate the relationship between neurocognitive deficit and personality factors
- To evaluate the relationship between coping style and personality factors

### **Hypothesis**

- There will be a significant relationship between neurocognitive deficit on coping style in schizophrenia remission patients.
- There will be a significant relationship between neurocognitive deficits on personality factors in schizophrenia remission patients.
- There will be a significant relationship between personality factors and coping style in schizophrenia remission patients.

### **Inclusion Criteria**

- Patients with diagnosis of schizophrenia who are in remission according to ICD-10.
- Age range between 18-45 years.
- Both male and female gender included.
- Education level 8th standard and above
- Diagnosis of Schizophrenia given by a senior psychiatrist.

### **Exclusion Criteria**

Subjects were excluded if they had any other comorbid psychiatric disorder other than schizophrenia as assessed by Mini International Neuropsychiatric Interview(MINI)

- Those who are currently symptomatic.
- A history of head injury, seizure disorder or a diagnosis of chronic general medical condition (cancer, heart and kidney failure, HIV etc.).
- Those who have auditory/visual impairment were excluded as they would find it difficult to perform the neuropsychological test .
- Those who have mental retardation were excluded as they would have difficulty in understanding and performing neuropsychological test.

**Study Type:** Cross-Sectional

**Sample Source:** The study was conducted on outpatients in Department of Psychiatry from SRM Medical College Hospital & Research Center, KATTANKULATHUR

**Study Duration:** November 2016 to April 2017

**Sampling Method:** Purposive Sampling

**Sample Size:** 30 schizophrenia patients

## **Assessment Tools**

### **1. Socio Demographic Proforma**

A specially designed Proforma which included various socio demographic details such as age, sex, religion, education level, occupation, marital status, family type, socioeconomic status, age of onset, duration of illness, number of hospitalization) was taken.

### **2. Mini-International Neuropsychiatric Interview (M.I.N.I - English Version 5.0.0:(Sheehan & Lecrubier, 1990)**

It is a short structured diagnostic interview, developed jointly by psychiatrists and clinicians in the United States and Europe, for DSM-IV and ICD-10 psychiatric disorders. The current version developed by Sheehan, D et al in 2006. It was designed to meet the need for a short but accurate structured psychiatric interview for multi-center clinical trials and in the present study it is used to screen for other comorbid psychiatric conditions in the schizophrenic patients. It is validated against the Structural Interview for DSM (SCID-P) diagnosis in English and French and against the composite international Diagnostic interview for ICD-10(CIDI) in English, French, and Arabic. In a study conducted by Sheehan and Lecrubier among three forty six patients, showed good inter-rater and test reliability.

### **3. Tower of London-**

The Tower of London was developed by Shallice in 1982. It is a well-known test used in applied clinical neuropsychology for the assessment of executive functioning specifically to detect deficits in planning, which may occur due to a variety of medical and neuropsychiatric conditions. The measure consists of 10 problems of ascending difficulty. The examinee is required to move colored beads mounted on three vertical pegs to match a presented configuration in accordance with two strictly enforced problem solving rules. Administration time is approximately 10 to 15 minutes.

#### **4. Wechsler Memory Scale III subtest Word Lists I and II –**

WMS was developed by David Wechsler in 1997. The latest version was standardized in the Indian population by Gurappa & Rao in 2009. Word Lists subtest uses a list-learning paradigm to measure immediate and delayed memory.

#### **5. Wechsler Memory Scale III subtest Visual Reproduction I and II-**

WMS was developed by David Wechsler in 1997. The latest version was standardized in the Indian population by Gurappa & Rao in 2009. This test evaluates immediate recall, delayed recall, discrimination and recognition for visual memory.

#### **6. Ways of Coping Questionnaire (WCQ)-**

The WCQ (Folkman and Lazarus 1988) is a self-report instrument to quantify adapting that requests that members bring to mind a current stressor and afterward rate how frequently they have utilized 66 distinctive adapting procedures. Singular scale scores are gotten from particular things that are summed and separated by an aggregate score to give a relative score. This relative score then mirrors members' relative inclinations among an arrangement of discrete adapting techniques. Relative scores are for the most part ideal on the grounds that, in addition to other things, they control for reaction inclination.

#### **NEO Five Factor Inventory (NEO-FFI)-**

The NEO Five Factor Inventory (form s) (NEO, Costa and McCrae 1992) is a self-report evaluation of identity measurements in view of the five-consider model of identity. This test presents members with 60 proclamations and requests that they rate the degree to which those announcements depict or don't portray their demeanors and conduct. The NEO frame s creates scores for the identity measurements of neuroticism, extroversion, openness, suitability, and good faith. For this review, the initial two measures were utilized: neuroticism and extroversion.

Broad proof of the factorial legitimacy of the NEO and its pertinence to culturally diverse specimens has been generally announced (cf. McCrae and Costa 1997). The short type of the NEO was decided for this review since it has been found to give great test-retest unwavering quality in schizophrenia

(Kentros et al. 1997) and to recognize people with schizophrenia from nonpsychiatric controls(Gurrera et al. 2000).

### **Procedure**

- Institutional ethical committee clearance was taken.
- For the study, the sample was recruited from the patients who are coming for follow up to the Out Patient unit of the Department of Psychiatry.
- Sampling was consecutively on purposive basis and 30 patients who satisfy the inclusion criteria was recruited into the study
- The informed consent was obtained from the subjects prior to the study and they were informed that the study participation is confidential and were explained about the purpose of the study and each assessments.
- Base line socio-demographic data was collected using the format for the same.
- M.I.N.I was used to screen any psychiatric comorbidity among schizophrenic participants.
- Tower of London was administered to assess the planning, executive function, problem solving and response inhibition of the subjects.
- Word lists I& II – was administered to measure immediate and delayed memory.
- Visual Reproduction I & II- was administered to evaluate immediate recall, delayed recall, discrimination and recognition for visual memory.
- WCQ was administered to measure coping.
- NEO-FFI was administered to measure the personality dimensions.
- Once all the assessments were done the scoring for each test was carried out and converted into data for statistical analysis.

### **Analysis**

Spearman rank correlation to see the relationship between the variables: neurocognitive functioning, coping style and personality in schizophrenia remission patients.

## **Discussion**

Neuropsychological deficits are found among patients with schizophrenia as reported in previous literature. Lysaker et al (2004) reported that intellectual impedances may, notwithstanding trading off the capacity to react to individual issues, influence adapting style. Both neurocognitive shortages and individual contrasts in identity are identified with adapting style in schizophrenia. Autonomous of identity, more noteworthy levels of various types of neurocognitive deficiency were related with expanded inclinations for escape shirking and removing procedures and diminished inclinations for planful critical thinking and social bolster chasing. On the other hand, autonomous of neurocognition, larger amounts of neuroticism anticipated a more prominent inclination for escape evasion and diminished inclinations for planful critical thinking and positive reappraisal techniques. More elevated amounts of extroversion finally anticipated more noteworthy dependence on social bolster chasing.

Current study hypothesized that there will be a significant relationship between Neurocognitive functioning, Coping style and Personality factors in Schizophrenia Patients. Our findings indicate that independent of personality, neurocognitive functioning and coping style are related. Independent of Neurocognitive functioning, coping style and personality are related whereas neurocognitive functioning and coping were not found to have an association.

Gurrera et al (2005) revealed that identity brokenness in schizophrenia might be interceded by sickness related changes in intellectual operations, or the neural procedures basic them. Lysaker et al.( 2003) from their review presumed that people with schizophrenia report having a lessened inclination for planful critical thinking and a more prominent inclination for separating, escape evasion, and constructive reappraisal.

Mini-International Neuropsychiatric Interview (M.I.N.I) was used to screen the patients for any co-morbid disorder.

Age group was maintained between 18-50 years in order to avoid any age related cognitive deficits. Formal education of at least 8th standard was maintained so that the subjects could understand and perform the tests. Subjects with history of any neurological illness or substance dependence were excluded to remove any confounding effects.

The Neuropsychological tests administered were: Tower of London ,word list I and II, and visual reproduction I and II subtests from the Weschler memory scale-III. The cognitive domains tested in this study are Response inhibition, planning, problem-solving, attention allocation, working memory, Visual memory and Verbal memory. The Ways of Coping questionnaire (WCQ) was also administered

to assess the coping style of the patient. Further, NEO-FFI scale was administered to assess their personality.

The findings of the current study and its implications with reference to previous literature are discussed below.

### **Neuropsychological Performance of patients with schizophrenia**

The study hypothesized that there will be a significant deficit in the neuropsychological performance of patients with schizophrenia who are currently in remission. The findings of the current study confirm this hypothesis as there is a significant deficit observed in the Neuropsychological performance in schizophrenia patient. Deficit was found in the tower of London domains and the wechsler memory scale-III subtests.

The neurocognitive areas assessed in this study can be discussed under these subcategories – Tests of Executive Functions; Tests of Memory.

#### **Executive function**

In the current study, we found that schizophrenic patients had noticeable deficit in the areas of planning, problem solving, response inhibition, attention allocation, working memory and mental flexibility when assessed by the Tower of London.

23(77%) patients showed below average execution time which indicates poor quality or level of executive planning and problem solving. This is in concordance with previous studies which reported planning deficits in schizophrenia using explicit task for planning ability, such as the tower of London( Shallice 1982; Hanes et al.,1996; Pantelis et al.,1997 1; Kosterman et al;2001)

21(70%) patients performed below average in overall problem solving time, that is, the patients took more time to solve the problems than the standard range, which indicates that there is a deficit in overall executive planning as related to problem solving speed. Marczewski et al. (2001) showed that patients took more moves to tackle the issues and this impedance exacerbated when the issue's multifaceted nature was expanded. In addition, schizophrenia patients were essentially slower in finishing the effectively tackled issue than their ordinary partners.

18 (60%) patients took more number of moves to solve the problems indicating deficit in attentional allocation, response inhibition, working memory and mental flexibility. Similar study findings were

stated by Morris et al., 1995, reported that the patients took significantly more moves to solve a series of problems and solved significantly fewer problems in the predetermined minimum number of moves. The findings suggest that there is a deficit in problem solving activity in schizophrenia. Similarly, Goldberg et al. (1990) also found that schizophrenia patients took altogether more moves to take care of every issue.

18 (60%) patients showed more number of rule violations and time violations indicating deficit in the ability to govern and control executive planning and problem solving in accordance with rule constraints and the lack of ability to plan and execute problem solving in a specified temporal period. This is in agreement with the findings of Bustini et al. (1999) in which their schizophrenia patients took more moves and also made more unlawful moves (number of govern breaking conduct) than controls.

In a study carried out by Neuchterlein et al., (2012) consistent impairment in cognitive functioning among schizophrenic patients who are currently in state of remission was shown. They stated that cognitive deficits were found to endure across psychotic and clinically remitted periods.

### **Working memory**

In discussions about the cognitive processes associated with schizophrenia, the role of memory is often highlighted (Phillips, Wynn, Gilhooly, Della Sala, & Logie, 1999). Braver and Cohen (2001) argues that working memory is important in formulating, retaining, and implementing plans.

Gilhooly et al. (2002) concluded that solving the problems of the Tower of London relies on visuo-spatial working memory capacity. A meta-analysis by Forbes et al. (2009) reported deficits in working memory in schizophrenia patients. This is in agreement with our study. In our study 18(60%) patients were found to have working memory deficit based on their total number of move scores made in the Tower of London.

### **Verbal and Visual Memory**

In the present study, patients showed impairment on both verbal and visual memory. 22 (73%) patients showed deficit in immediate verbal memory, 19 (63%) patients showed deficit in delayed verbal memory, 18 (60%) patients showed deficit in immediate visual memory and 27 (90%) patients showed deficit in delayed visual memory.

Verbal and visual learning deficits are reportedly prominent trait markers for schizophrenia (Snitz, Macdonald & Carter, 2006). Substantial impairments have been described for both immediate and 30 minute recall of verbal and visual materials (Skelley, Goldberg, Egan, Weinberger & Gold, 2008). Similar result is found in our study. The patients showed deficit in both immediate and delayed verbal and visual memory.

Bowie et al. (2006) in their study reported that, schizophrenia patients showed poor recall of verbally learned information. Schizophrenia patients perform poorly on word list task (WMS-III) (Karilampi et al. 2007) and verbal delayed memory (WMS-III) (Robles et al. 2008). These findings are in line with our study findings. Our patients performed poorly on word list I task and word list II task, indicating deficit in verbal immediate memory and verbal delayed memory.

Our results also confirm those of Gold et al. (1992, 2000) that have demonstrated an impairment of schizophrenia patients on immediate and delayed recall on the previous versions of Weschler Memory Scale.

### **Correlation between Coping domains and Executive functions**

In schizophrenia disorder, coping strategies play a significant role in one's ability to adapt to stressful life conditions. (Strous, Ratner, Gibel, Ponizovsky & Ritsner, 2005)

Intellectual shortages, by prudence of their negative effect upon the capacity to adequately assess and consider stressors (Perm et al. 1993; Corrigan and Toomey 1995), may prompt an adapting style portrayed by renunciation and shirking. A detached, incapable adapting style may speak to an educated reaction to perpetual disappointments that are themselves the regular result of psychological deficits. (Lysaker et al., 2004).

In the present study, there was a positive correlation between move score and distancing coping style. Correct score and distancing coping style is also positively correlated. Move score, correct score, rule violation and initiation score are all negatively correlated with planful problem solving coping style. This is similar to the findings of Lysaker et al (2004). They found that more prominent levels of various types of neurocognitive shortfall were related with expanded inclinations for escape shirking and separating methodologies and diminished inclinations for planful critical thinking and social bolster chasing.

Neurocognitive shortfalls prompt an aloof, avoidant, and non-critical thinking adapting style, that in past writing has been connected to poorer psychosocial work (e.g., Wiedl 1992; MacDonald et al. 1998)

### **Correlation between Coping domains and personality factors**

Coping has been described as “personality in action under stress” (Bolger, 1990), and theorists have suggested that “coping ought to be redefined as a personality process” (Vollrath, 2001). These ideas have been supported by evidence that personality and coping have a shared genetic basis (Kato & Pedersen, 2005). Identity contrasts have been perceptible among people with schizophrenia (Donat et al. 1992; Tien et al. 1992), seem to originate before disease (Hogg et al. 1990), and are generally steady after ailment onset (Kentros et al. 1997).

In our study, escape avoidance coping style was positively correlated with neuroticism and planful problem solving coping style was negatively correlated with neuroticism. Because Neuroticism involves intense emotional and physical responses to stress, it is linked to attempts to minimize unpleasant arousal through disengagement strategies such as avoidance and withdrawal. (Jennifer, Smith and Flachsbart, 2007) . Neuroticism has anticipated a more prominent dependence on detached and avoidant adapting systems (McCrae and Costa 1986). Correlation between personality factors and tower of London variables

No significant relationship was found between personality and executive functions in our study.

This finding was contradictory to the findings by Mesholam-Gately et al (2009) .They detailed that more noteworthy consideration/arranging was connected with higher extraversion and honesty scores.

Essentially, Lysaker et al( 1999) Lysaker and Davis (2004) Gurrera et al (2005) found in their reviews relationship between identity elements and undertaking execution level. Neuroticism was related with more regrettable execution while extraversion, openness, appropriateness and reliability were related with better execution, and better memory was connected with openness, in patients.

## **Conclusion**

The current study looked at the relationship between neurocognitive functioning, coping style and personality factors in schizophrenic patients who are currently in remission.

The results showed that independent of personality, neurocognitive functioning and coping style have a significant relationship between them. There was a positive correlation between move score and distancing coping style. Correct score and distancing coping style is also positively correlated. Move score, correct score, rule violation and initiation score are all negatively correlated with planful problem solving coping style.

Conversely, Independent of Neurocognitive functioning, there is a significant relationship between coping style and personality. Escape avoidance coping style was positively correlated with neuroticism and planful problem solving coping style was negatively correlated with neuroticism.

Whereas, neurocognitive functioning and coping style did not have a significant relationship between them.

The study showed that there is a deficit in the neuropsychological performance of patients with schizophrenia who are currently in remission. Patients had deficit in the areas of planning, problem solving, response inhibition, attention allocation, working memory and mental flexibility.

The patients were found to have a deficit in both verbal memory, and visual memory.

Supportive and psycho-education systems and psychological behavioral treatment can be executed to oversee side effects and to assist patients to utilize more versatile adapting procedures to improving their personal satisfaction. The capacity to adapt to trouble can considerably add to the diminished odds of backslide.

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