
**'THEORY OF MIND' DEFICITS IN PATIENTS OF
SCHIZOPHRENIA ATTENDING TERTIARY CARE
PSYCHIATRIC UNIT - A COMPARATIVE STUDY**

**BY
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Dissertation

Submitted to the

**KLE Academy of Higher Education and Research,
Belagavi, Karnataka.**

In partial fulfilment of the requirements for the degree of

**DOCTOR OF MEDICINE
IN
PSYCHIATRY**

**JAWAHARLAL NEHRU MEDICAL COLLEGE
KLE ACADEMY OF HIGHER EDUCATION AND RESEARCH
BELAGAVI- 590010, KARNATAKA, INDIA**

APRIL - 2022

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ACCEPTANCE LETTER

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ACRONYMS

ACC	Anterior Cingulate Cortex
AD	Alzheimer's Disease
AS	Attributional Style
BPD	Borderline Personality Disorder
DSM-5	Diagnostic and Statistical Manual of mental disorder-5
ECT	Electro-Convulsive Therapy
EP	Emotional Processing
FDR	First-degree Relatives
FHR	Familial High risk
fMRI	Functional Magnetic Resonance Imaging
FTD	Fronto-Temporal Dementia
fvFTD	Frontal variant Fronto-Temporal Dementia
ICD-10	International Classification of Diseases-10
MASC	Movie for the Assessment of Social cognition
MINI	Mini International Neuropsychiatric Interview
MINI CR	Mini International Neuropsychiatric Interview- Clinician Rated
MINI PR	Mini International Neuropsychiatric Interview- Patient Rated
MMSE	Mini Mental Status Examination

NC	Neuro Cognition
Non-FHR	Non-Familial High Risk
PANSS	Positive and Negative Syndrome Scale
PET	Positron Emission Tomography
SC	Social Cognition
SOCRATIS	Social Cognition Rating Tools in Indian Setting
SP	Social Perception
SPQ	Schizotypal Personality Questionnaire
ToM	Theory of mind

ABSTRACT

Introduction: Theory of mind (ToM) is the ability of a person to understand his and others' mental states. It is part of social cognition and is known to affect patients of schizophrenia by declining their socio-occupational functioning. There continues a debate whether it is state dependent or a trait of schizophrenia and by far the results have been mixed.

Objective: To assess ToM deficits in patients of schizophrenia and compare with their first-degree relatives (FDR) and healthy controls. Additionally, to identify the factors affecting the ToM in patients of schizophrenia.

Methods: A cross-sectional comparative study to assess ToM deficits in 30 patients of schizophrenia in remission and their FDRs and compare them with healthy controls. Social Cognition Rating Tools in Indian Setting (SOCRATIS) was used to assess ToM. Positive and Negative Syndrome Scale (PANSS) was applied for assessment of severity of schizophrenia. The probable factors affecting ToM were also assessed.

Results: 43.33% cases had first order ToM deficit, 77.33% had second order ToM deficit and 93.33% cases had deficit in faux pas. FDRs performed poorly as compared to controls but not as poor as cases.

Conclusion: The study shows that patients with schizophrenia have ToM deficits. These deficits are present even during remission, which could mean that ToM is not state dependent and is a trait marker of schizophrenia. FDRs also performed poorly on ToM tasks than healthy controls, which could mean that ToM is a possible endophenotype of schizophrenia.

Keywords: Theory of mind, schizophrenia, first-degree relatives, SOCRATIS, Endophenotype

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INTRODUCTION

Theory of mind is the ability of a person to understand his own and others mental states and extrapolate their actions, thinking and beliefs.¹ It comprises of understanding false beliefs, hints, intentions, deception, metaphor, irony and faux pas.² Over the years it has been debated that “theory of self and others’ minds” is an adaptive process that has been evolved in humans during Pleistocene to deal with the challenging social environment.^{2,3}

Since ToM forms the basis of how we perceive the world and behave in it, a malfunctioning ToM can lead us to incorrectly interpret the signals in our surroundings and come to wrong conclusions. ToM deficits are seen in a variety of psychiatric conditions like schizophrenia. Patients with schizophrenia have difficulty in engaging in social communications and have poor social interactions.⁴ Many studies have compared ToM in schizophrenic patients and healthy control groups and have found that schizophrenic patients perform more badly in at least one ToM task.^{5,7}

Many psychotic and other behavioural symptoms, may be best understood from the perspective of a disturbed capacity in patients to relate their own intentions to execute behaviour, as well as to monitor others' intentions. However, how a defective ToM in schizophrenia is linked to other areas of cognition, and how the impairment varies with acuity or the chronicity of the schizophrenic disease, are still debated. There also continues a debate between theorists, whether impaired ToM causes the symptoms of schizophrenia or is simply a consequence of the illness i.e., is it a state or a trait? Some believe that ToM is state independent and a trait marker of schizophrenia while others believe it is state dependent and only present during acute phase.

Studies have also found that not just the patients, but first-degree unaffected relatives of patients don't not perform as well as healthy controls on ToM tasks. Overall, the results for ToM deficits have been mixed given because of overall, As the operational concept of ToM varies a lot the results have been mixed since there is an inconsistency in the way ToM has been measured in studies.

Although, it is a known fact that schizophrenia causes deficits in Theory of mind, the Indian data is limited and thus, this study is aimed at finding the deficits in TOM and determining the demographic and clinical factors associated with these deficits. The study is intended to provide more evidence and support to the already existing literature in this area. This might aid in further research to help have better functional outcomes in schizophrenic patients.

OBJECTIVES

1. To assess prevalence of theory of mind deficits present in patients of schizophrenia.
2. To compare the deficits in theory of mind in patients of schizophrenia with their first-degree relatives and age and sex matched healthy controls.
3. To study the factors affecting the theory of mind deficits in patients of schizophrenia.

REVIEW OF LITERATURE

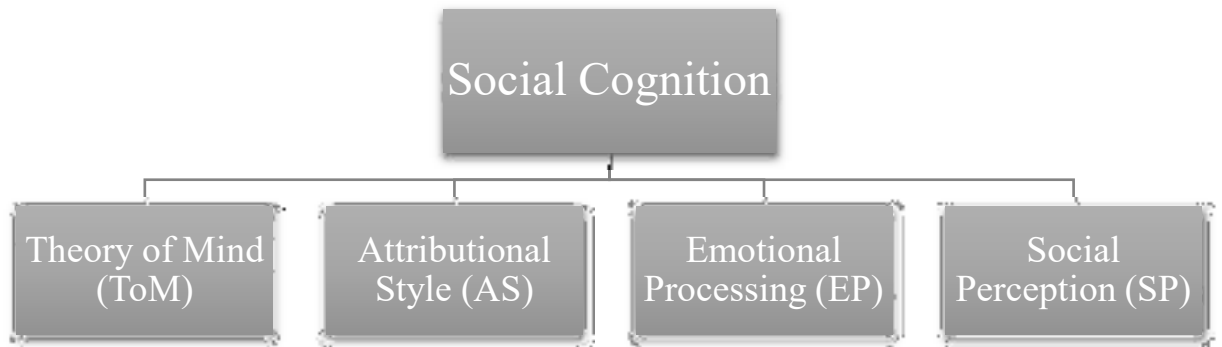
Social cognition

Social cognition (SC) is a crucial aspect of social behavior and how one conducts oneself in a social setting. Many people have tried to define it, Brothers (1990) defined it as “the human ability and capacity to perceive the intentions and dispositions of others”.⁸ Another definition given by Adolphs (1999) “the process that subserve behavior in response to conspecifics, and, in particular, to those higher cognitive processes subserving the extreme, diverse, and flexible social behaviors that are seen in primates”.⁹ In other words, how we behave in a social setting depends on how we perceive and integrate the information and social cues. This requires an arrangement between our attention, memory, motivation and emotion to form an intricate cognitive process called the social cognition.¹⁰⁻¹² This allows us to produce an apt behavior by enabling us to recognize other’s expressions, emotions, their actions, identities and social hierarchy.¹³

There is growing evidence that both neuro cognition (NC) and social cognition (SC) are different entities and have their own distinct neuronal pathways. As compared to NC, SC has only recently come to light as the neuronal network involved in processing of social information (prefrontal cortex, fusiform gyrus, superior temporal sulcus and amygdala) is being more and more researched.¹⁴ The parts of the brain that are involved in this process combine to form what is called the ‘social brain’.

Domains of social cognition

SC is a multifaced concept which involves 4 domains:



Theory of mind: is the ability of a person to understand his own and others mental state and extrapolate their actions, thinking and beliefs.¹ It comprises of understanding false beliefs, hints, intentions, deception, metaphor, irony and faux pas.²

Attributional style: tendency of a person to explain the reason of a social action (positive or negative) and associate it to themselves or others or the event itself.¹⁵ For example, if your friend tells you to leave the room, you can either think that he is angry with you or he just wants to be alone.

Emotional processing: ability to comprehend others' emotions by identifying them (emotional perception/recognition), understanding them (at the basic level, like attributing tears to sadness) and managing them (at a more complex level).¹⁶

Social perception: refers to “the decoding and interpretation of social cues in others”.¹⁶ It is the ability how a person assesses another person's behavior by combining the given information and former social knowledge, like knowing the relationship between two strangers by just seeing them.^{17,18}

Theory of mind (ToM)

Over the years it has been debated that “theory of self and others’ minds” is an adaptive process that has been evolved in humans during Pleistocene to deal with the challenging social environment.^{2,3} Not just humans, but according to Jolly and Humphrey’s work, primates’ cognitive capabilities are more than what they require for their daily feeding and roving, and these abilities have evolved as a result of the constant social pressure in the environment.^{19,20} According to the “social brain hypothesis”, better mentalizers outdo the ones with poorer mind-reading capabilities and have better social success, and all together increase their odds of survival and reproduction^{2,21}.

The term “theory of mind” was first used for chimpanzees by Premack and Woodruff in their original article wherein they stated that chimpanzees may have the ability to understand mental states of each other.²² Child psychologists later adopted the term to explain development of social abilities in children.

None the less, having an advanced TOM comes with a price. Since ToM is active in humans all the time, they continuously judge people’s intentions and thus, at risk of making false inferences, either over or under evaluating the social interaction.²³ Therefore, becomes important for a person to verify his or her inferences with the reality and only extract relevant information and not go by the literal meaning of words. This requires an intact ToM and any dysfunction in the underlying mechanism is proposed to cause psychopathologies such as schizophrenia, personality disorders.⁴

ToM has been divided based on order of complexity.

- First order ToM: the ability to infer that the other person can hold a false belief. Involves understanding metaphors.²⁴
- Second order ToM: the ability to infer that someone can hold a false belief about someone else's belief. It is more complex and advanced than first order ToM. Involves understanding irony and faux pas.²⁵

Development of Theory of Mind ability

The ability to identify mental states of oneself and others, is a sequential process, just like a child cannot run unless he has learned how to stand and walk. The model of development of TOM, the ontogeny, was given by Baron-Cohen in 1995 on the basis of evolution.²⁶

By the first year, primarily, an infant develops the ability to differentiate animate objects from inanimate and later by the end of first year, they develop joint attention and mentalizing signs, which means that they start looking and moving their heads in the direction of another person's gaze and focusing on their attention.²⁷ By around 18 months, a child starts understanding people's emotions, their desires and intentions.²⁸ "Decoupling" emerges at 2 years of age. The term was given by Leslie to describe the ability to tell apart what is reality and what is just pretense and subsequently, they start participating in what is called "pretend play".²⁹ In addition, during this time, children also begin to recognize themselves in the mirror.

Around 3-4 years, they are able to tell apart their own and others' beliefs i.e., first order ToM (recognize that a person may hold false beliefs). Subsequently, develop second order ToM by 5-6 years, which is that someone may hold a belief about someone else's belief.³⁰ Higher order ToM, metaphor and irony, don't develop until the age of 8-9.³¹

Highest order of ToM is Faux Pas which doesn't develop before 9-11 years of age.³² A faux pas is a social indiscretion in which something awkward or offensive is said by a person in a conversation, unintentionally and it produces a negative emotion in the person on the receiving end.³³

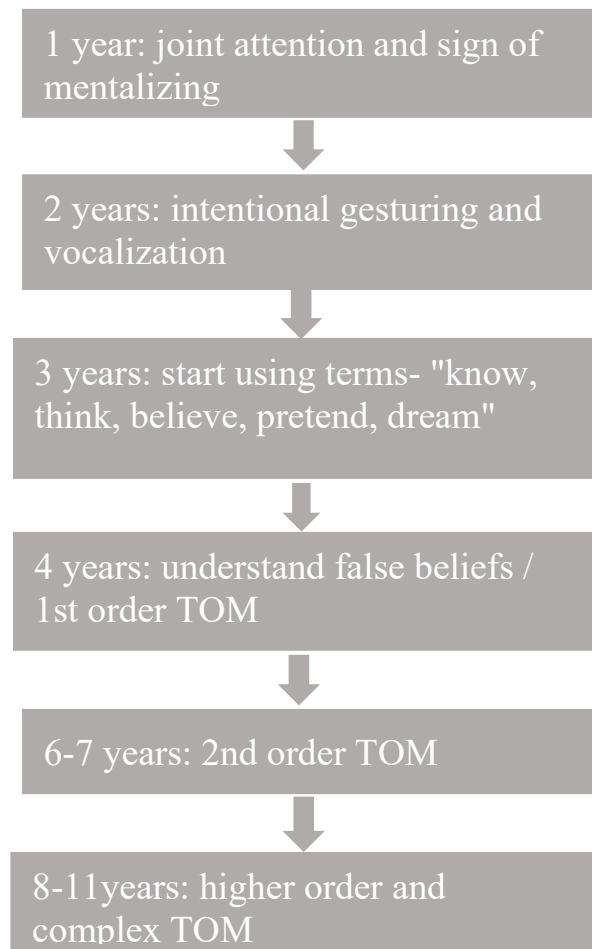


FIGURE 1: Representation of Ontogeny of Theory of Mind

It has been pointed out in previous literature, that developmental steps of ToM are universal. Callaghan et al (2005) conducted a cross-cultural study (in 5 countries) to measure the onset of false belief understanding in children.³⁴ They came to a conclusion that the onset of nearly 5 years was synchronous across all the cultures. However, other cross-cultural studies also point out that even though the development

appears to be universal, the time at which it appears in different cultures, varies and thus there it might be influenced by experiential and environmental factors.³⁵ Carpendale and Lewis (2004) emphasized, if children are exposed to more conversations about mental states by their parents, they acquire TOM abilities earlier than others.³⁶

Theories of Theory of Mind:

1) The Modular theory - this theory supports the idea that ToM has a separate modular organization in the human brain like other specific cognitive functions which are represented by different areas which only cater to that specific function.³⁷

Scholl and Leslie (2001) hypothesized that theory of mind develops as the brain structures responsible for it matures, and that experience can only trigger it but cannot define its makeup.³⁸ In their previous article, they also proposed that there exists a 'selection processor' which picks up relevant information from the social interaction and increases the possibility of interpreting the mental state correctly.³⁹

2) The Metarepresentational theory – Perner (1991), proposed a nonmodular model of ToM which, on the contrary, put forwards the notion that individual experience plays a more important role in the development of theory of mind by reshaping the preexisting organization.⁴⁰

3) The Simulation theory – the simulation theory says that in order to understand others mental states, one needs to introspect and “put oneself into others’ shoes “. This model received extra backing from the mirror neuron system that one needs

to replicate the mental picture so as to infer someone's mental state.⁴¹ Like the metarepresentational theory, this theory also emphasizes the role of experience in shaping ToM.⁴²

Types of Theory of Mind:

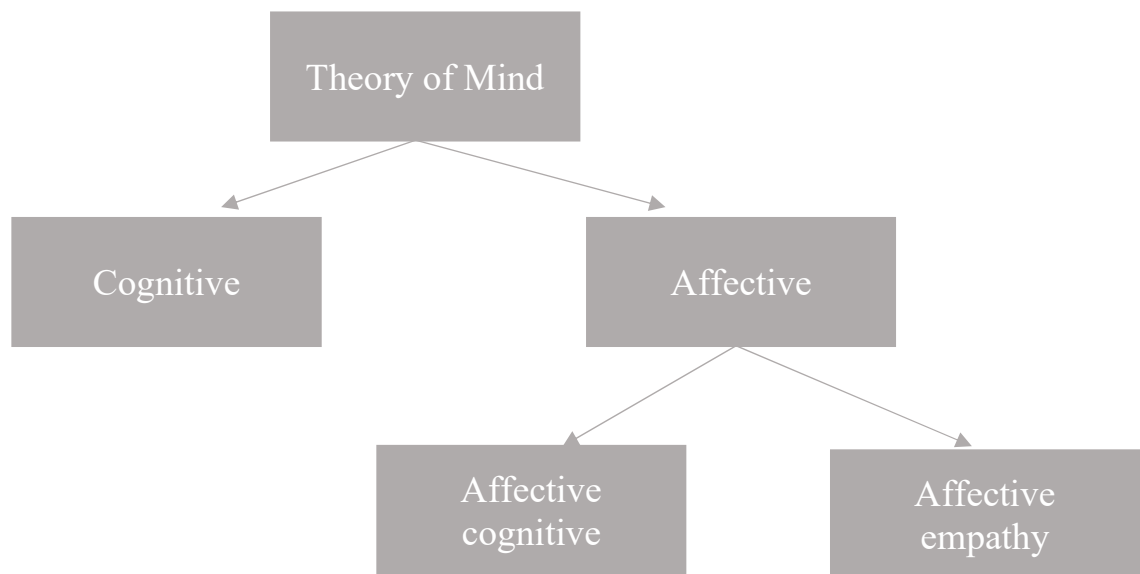


FIGURE 2: Representation types of Theory of Mind

- 1) Cognitive ToM – the part of ToM that deals with the understanding of beliefs and intentions.⁴³
- 2) Affective ToM – the domain of ToM that deals with making interpretations about emotions and sharing emotional states of oneself and others is called affective ToM.⁴⁴ It can further be divided into affective cognitive component and affective empathy component which deals with recognition of emotions and experiencing emotions respectively.⁴⁵

Neurobiology of Theory of Mind:

Various neuroimaging studies have tried to localize specific neural structures and circuits involved in ToM with the help of lesion studies in patients with stroke or other brain injuries and functional brain imaging.⁴⁶ Studies done in healthy individuals have shown that medial prefrontal cortex and to some extent orbitofrontal cortex is consistently activated when they perform any TOM task.⁴⁷⁻⁴⁹ Besides, in autistic people, these areas don't get activated, confirming the findings. Brunet et al (2000) carried out a study on healthy individuals using positron emission tomography (PET). Individuals were showed picture stories and were evaluated based on how they attributed the characters intentions in the given picture scenario. It was found that during the task, right middle, right medial prefrontal cortex and temporal cortex were activated.⁵⁰

Some non-human primate studies have also revealed possible brain areas. Studies done on macaque monkeys have shown that middle temporal lobe, mainly the superior temporal sulcus selectively fires when they perceive gaze direction of other monkeys and goal directed behavior.⁴¹ A homologous area has been found to get activated in humans on functional brain imaging when they are showed photos of "implied" movement, for example a still photo of a man throwing a ball.⁵¹ In several functional brain imaging studies increased blood flow in superior temporal sulcus area has been observed during ToM task.⁵²

On the other hand, lesion studies have helped to distinguish specific cognitive abilities from ToM. For instance, a study done on people with parietal and frontal lobe lesions, found impaired ToM but intact executive functioning.⁵³ Since both ToM and executive functioning is localized to prefrontal cortex, it can be concluded that ToM

function is separate from other general cognitive functions and impaired ToM cannot be explained by impairment of general intelligence.^{54,55}

Mirror neurons and Theory of mind: mirror neurons are specific nerve cells that are present in temporal lobes of non-human primates. These cells are unique as they get activated when a person either carries out a task or observes the same task being carried out by another individual.⁵⁶ In monkeys, these cells are predominantly present in ventral premotor cortex which is homologous to Brocas area in humans.⁴¹ Likewise in humans, functional brain imaging studies have shown that mirror neuron system activity is present in inferior parietal lobe, inferior frontal gyrus and superior temporal sulcus.⁵⁷ There is some correlation between areas responsible for mirror neuron system and ToM. Several studies have found atypical activity of mirror neuron in autistic people ^{58,59} out of which one recent study has found cortical thinning of the areas mentioned above ⁶⁰, further augmenting the evidence. Also, based on the simulation theory that states that in order to infer someone else's mental state, one must put oneself in their shoes, which means that we must mentally simulate actions done by others so as to understand their intentions.⁶¹

Nevertheless, just understanding goal directed action is not sufficient for proper ToM functioning. There are other structures in the brain that help appreciate other people's perspective. One such structure is inferior parietal cortex. Through functional brain imaging it has come to light that left inferior parietal cortex gets activated during a first-person perspective task like when someone imitates an action of other.⁶² On the other hand, the right inferior parietal cortex lights up in a third-person perspective task like observing someone else imitating your actions. Through this information, it can be deduced that right inferior parietal cortex may be important

for attributing others' mental states and vice-versa, left parietal cortex may be important for attributing one's own mental states.⁶³

Another brain area that has constantly been shown in studies to participate in ToM is anterior cingulate cortex (ACC). Recently, an area in ACC, the paracingulate gyrus has also received some attention. Gallagher and Frith (2003) have drawn people's attention to spindle cells present in paracingulate gyrus, which have appeared recently in evolution and consistently gets activated on functional brain imaging during ToM performance.⁶⁴ These spindle shaped cells are unique to apes and humans and their density has an inverse relation with species' genetic closeness with humans, i.e., they are present extensively in chimpanzees that are closest to humans, lowest in orangutans and in-between in gorillas.⁶⁵ Even though their exact role is still not known but it has been postulated that they have appeared in evolution to gain an inhibitory control in respect to social interaction to achieve tactful deception.⁶⁶

Assessment of Theory of Mind:

The operational concept of ToM varies a lot because the definition is broad and thus, there are a number of ways ToM has been tested in studies. Most common used test is the false belief task.^{67,68} "Sally and Anne Test" is the classical first order false belief or deception task test wherein one is assessed based on their ability to tell apart if someone can have a belief which is different from the set of circumstances. A scenario is read to the participant in which one of the characters, Sally, puts her ball in a basket, covers it with a cloth, and then leaves. Without Sally's knowledge, her friend Anne moves the ball to another spot while she is gone. Sally returns to the room and then the participant is asked where Sally believes the ball is and where she will search for it. The participant must appreciate that Sally still thinks the ball is in the basket where she left it, and not in the new place, in order to correctly answer.³⁰

In the second order ToM task, a person has to deduce the belief of an individual about the belief of another individual.⁴⁶ Like in first order task, a scenario is read “Sally and Ian are at the station because Sally has to catch a train home. Sally lives in Homesville, but the train does not stop at the Homesville station. Sally will have to get off at Neartown and walk. Sally goes to buy a magazine to read on her journey before she buys her ticket. While she is gone, there is an alteration to the timetable, and the train is now going to stop at Homesville. The guard tells Ian about this change, and Ian sets off to find Sally to tell her, but before Ian finds her, the guard meets Sally and tells her, “The train will now stop at Homesville.” Ian eventually finds Sally who has just bought her ticket.” (Frith and Corcoran 1996, p. 528)⁶⁷ Following the reading of this narrative, the participant is asked which station Ian believes Sally purchased her ticket for, and in order to correctly answer, the participant must appreciate that Ian wrongly believes Sally still believes the train will not stop at Homesville.

Short stories featuring double bluff, blunders, persuasions, or white lies, cartoons, or other visually presented information have been used to measure theory of mind abilities in persons with psychopathological disorders.⁶⁹ In schizophrenia, short stories with or without props, visual sequencing tasks, and tests of interpretation of hints underlying indirect speech, metaphor, and irony have been used to test ToM. The pictorial theory of mind material has been changed over time to better control for attention, memory, general intelligence, and verbalization interference.⁴⁶

The more complex ToM abilities like hints, irony and metaphor are evaluated by interpreting indirect speech.⁶⁹ However, it has been debated that metaphor only requires understanding first order ToM but understanding irony requires second order

ToM because one has to infer what the person intended to say rather than the literal meaning of words.⁷⁰

Social Cognition Rating Tools in Indian Setting (SOCRATIS) (Mehta and Thirthalli, 2014)⁷¹: assesses three domains of Social cognition – theory of mind, attributional styles and social perception. Social cognition and thus, ToM, is known to be influenced by culture.⁷² SOCRATIS has been culturally adapted (e.g., use of local names, outfits, and actors) as well as translated (e.g., use of conceptual instead of literal translations in two Indian languages) to adapt the tasks to the Indian cultural setting without affecting the social cognition concepts that they were intended to assess.⁷ It includes tests to measure theory of mind (1st and 2nd order false belief picture stories, metaphor-irony stories, and faux pas stories), social perception (true/false questions on social and non-social cues after showing the participants videos on low and high emotions depicting a social interaction), and attributional styles (causal attributions made for positive and negative social events).⁷³

Theory of Mind and psychopathologies:

Since ToM forms the basis of how we perceive the world and behave in it, a malfunctioning ToM can lead us to incorrectly interpret the signals in our surroundings and come to wrong conclusions. ToM deficits are seen in a variety of psychiatric conditions. It has been extensively researched in Autism spectrum disorders, frontal lobe pathologies and schizophrenia.^{53,74,75} Besides these, ToM has also been implicated to be deficient in Alzheimer's and other dementias, personality disorders like antisocial and borderline personality disorders and bipolar affective disorder.^{76,77}

- 1) Autism spectrum disorder and Theory of Mind - ToM has been extensively researched in autism. Patients with autism spectrum disorder have difficulty in verbal and non-verbal communication. Baron Cohen et al (1994) thus suggested that this difficulty in social interaction and communication could be because they struggle to understand other people's beliefs.⁷⁸ There is great extent of evidence suggesting that patients with autism perform poorly on ToM tasks.^{79,80} Several mechanisms have been proposed for the same, some argue that these patients are born without ToM skills while others believe that they have delayed trajectory of development of ToM as compared to non-autistic children and thus fail to attain full ToM skills.⁸¹

- 2) Mood disorders and Theory of Mind - This is an area of ongoing research and thus, findings have been inconsistent. Kerr et al (2003) conducted a comparative study between symptomatic bipolar patients and patients in remission and found that ToM was only dysfunctional during the acute stage.⁸² However, some metanalysis show that patients with bipolar disorder have significantly impaired ToM irrespective of symptomaticity, with impairment being more pronounced in the acute stage as compared to remitted stage. Bora et al (2016) conducted a metanalysis of thirty-four studies comparing 1214 patients with bipolar disorder patients and 1097 healthy controls were included. They found that in remitted and subsyndromal patients, there is significant but moderate ToM impairment. Acute episodes were seen to have more pronounced ToM deficits.⁸³

Another metanalysis conducted by de Sequeira et al (2020) carried out a meta-analysis of 30 studies, comparing 1294 euthymic bipolar disorder patients and 1116 healthy controls and found ToM impairments in remitted patients and concluded that it can be a potential endophenotype.⁸⁴

3) Personality disorders and Theory of Mind - ToM is said to be impaired in a number of personality disorders, namely, borderline personality disorder (BPD), antisocial personality disorder and schizotypal personality.⁴⁶ ToM dysfunction is thought to be a key component in explaining patients with borderline personality disorder's affective disturbances and interpersonal problems since they might be misinterpreting people's mental states, for example, misreading another person's intentions as threatening or repellent which might produce strong negative effects and lead to interpersonal issues.^{85,86} However, the evidence for the same is limited and inconsistent. Measuring ToM in BPD patients requires a special tool called Movie for the Assessment of Social Cognition (MASC)⁸⁷ which helps to assess ToM in BPD more precisely as it is close to actual interpersonal encounters and sensitive enough to detect the aberrant understanding that people with BPD are likely to have.⁸⁸ Based on studies conducted using this tool, BPD patients are found to have hyper mentalization i.e., they go far beyond what is visible.^{89,90}

Besides BPD, schizotypal personality is seen to have poorer ToM performance.^{91,92} There are mixed results when it comes to the specificity of the association between ToM and schizotypy. Some research found a clear link between positive schizotypy and ToM, whereas others found a link between negative schizotypy and poor ToM performance.⁹³ In a metaanalysis both ToM-reasoning and ToM-decoding were negatively correlated with higher schizotypy scores.⁹⁴ This finding backs up the possibility that schizotypy and schizophrenia are a continuum.⁹⁵

4) Brain damage and neuro-degenerative disorders- ToM deficits differ in patients with neuro-degenerative disorders or patients with brain damage due to stroke, head injury or a brain tumor because unlike other disorders discussed above, ToM

in such patients is developed normally. Many studies have shown that patient with compromised right frontal lobe perform poorly on a variety of ToM tasks⁹⁶⁻⁹⁸ and damage to the orbitofrontal cortex on both sides has been linked to difficulties interpreting faux pas.⁹⁹ However, this impairment is independent of other cognitive dysfunction.⁵³

Some studies have looked at theory of mind capacities in various neurodegenerative disorders like Alzheimer's disease (AD) and frontotemporal dementia (FTD). When compared to healthy age-matched normal control, Cuerva et al. (2001) observed that patients with mild to moderate AD were only deficient on the more difficult second order false belief tasks.¹⁰⁰ However, these findings could have been confounded by other cognitive impairments generally found in AD. The frontal variant of frontotemporal dementia (fvFTD), on the other hand, is marked by alterations in personality and social conduct, with most cognitive domains remaining largely intact, at least in the initial stages of the disease.¹⁰¹ Gregory et al. (2002) observed that individuals with fvFTD with mild Alzheimer's dementia performed significantly worse on all theory of mind activities with increasing impairment as task complexity increases when compared to healthy control subjects.¹⁰² This could suggest that patients with FTD have selective ToM deficits.

5) Schizophrenia-

Schizophrenia belongs to the group of schizophrenia spectrum and other psychotic group of disorders. As per Diagnostic and statistical manual of mental disorders 5th edition (DSM-5), it is defined as “abnormalities in one or more of the following five domains: delusions, hallucinations, disorganized thinking (speech), grossly disorganized or abnormal motor behavior (including catatonia), and

negative symptoms.”¹⁰³ According to International Classification of Diseases (ICD-10), “it is characterized by fundamental and characteristic distortion of thinking and perception and by inappropriate or blunted affect.” There is no one pathognomonic symptom, rather a constellation of signs and symptoms along with impaired occupational or social functioning.¹⁰⁴

Historical background:

In 1852, Morel coined the term “*démence précoce*” to describe a set of symptoms that began in adolescence and caused withdrawn and odd behavior, self-neglect and subsequently causing deterioration of intelligence.¹⁰⁵ Emil Kraepelin later separated *démence précoce* from manic-depressive psychosis.¹⁰⁶ Kraepelin’s work was majorly concerned with the chronic deterioration, however later, Eugene Bleuler was more concerned with the mechanism of the disease and thus, came up with the concept of “splitting of minds” and coined the term “schizophrenia” (Greek: “schizo” means split and “phrene” mean mind).¹⁰⁷

Both Kraepelin and Bleuler understood instinctively that cognitive deficits were essential parts of schizophrenia. Kraepelin’s understanding behind the division was not restricted only to psychotic symptoms, he also gave importance to his observation that in the longitudinal course, these patients have significant cognitive and behavioral deterioration.¹⁰⁸ Similarly, Bleuler divided the symptomatology into two, fundamental and accessory symptoms wherein former being principally cognitive in nature and later being mainly positive symptoms. He even went on to say that accessory symptoms wax and wane over time and are secondary to fundamental symptoms which are constant throughout the illness.¹⁰⁹

Cognitive impairment is said to be a trait of schizophrenia, be it acute or chronic psychosis or in remission.¹¹⁰ These cognitive deficits are prognosticators of social functioning in schizophrenics. Over the years, it has been observed that patients with schizophrenia have difficulty in engaging in social communications and have poor social interactions.⁴ Many studies have compared ToM in schizophrenic patients and healthy control groups and have found that schizophrenic patients perform more badly in at least one ToM task.⁵⁻⁷

Many people have tried to conceptualize ToM in schizophrenia in one way or the other, following are a few popular concepts.

- a) Frith (1992), was the first one to say that ToM in schizophrenic patients is affected as they are unable to understand mental states of themselves and others and this may be the reason for negative and positive symptoms. He raised a question that the psychotic symptoms can be an aftermath of the cognitive misinterpretation of intentions and deceptions of others. He proposed that there could be 3 possible outcomes of impaired ToM:

- Disorders of “willed action” (eg: apathy and disorganized symptoms)
- Disorders of self-monitoring (eg: delusion of control and hallucinations)
- Disorders of monitoring other persons’ thoughts and intentions (eg: delusion of reference and persecution)

His hypothesis best pairs with the modular model of ToM. According to Frith, patients with predominant negative and disorganized symptoms have more impaired ToM as compared to patients with positive symptoms as the former are incapable of understanding mental states of any kind, on the contrary, the later only have difficulty in understanding other’s mental states.¹¹¹

- b) Hardy-Bayle (1994) proposed that schizophrenic patients have impaired ToM because they have difficulty in integrating information (execution and planning). According to this model, patients who have pronounced disorganized symptoms have problem understanding others' actions because they are unable to understand their own mental states and thus, have the maximum deficit. Although, others with intact thought and language organization have preserved ToM. This hypothesis best pairs with the simulation theory of ToM.¹¹²
- c) Abu-Akel (1999), postulated that patients with positive symptoms may have "hyper ToM" i.e., they "overattribute" intentions and thus develop delusions.¹¹³ Along with Bailey in an article published in 2000, they proposed types of ToM deficits:
- Genuinely impaired ToM
 - Normal ToM without the ability to apply the knowledge
 - Hyper ToM
- d) Walston et al (2000), debated that some schizophrenic patients have intact ToM because they can't have the ability to attribute mental states if their ToM is impaired.¹¹⁴

Many studies have been performed subsequently to test the above-mentioned hypothesis. Both Frith's and Hardy-Bayle's models have received immense appreciation, however the findings of some studies have been inconsistent.

Bora et al. (2009a, b)^{115,116} and Sprong et al. (2007)¹¹⁷ meta-analyses support the Frith model of ToM deficits in schizophrenia. On several measures of ToM, the clinical groups were found to be more than one SD below the mean of the control patients ($d=1.13$). Sprong et al (2007) conducted a meta-analysis of twenty nine studies (1518 samples) and found that patients with more disorganized symptoms

performed poorly ($d=-2.23$) than patients with more negative ($d=-1.28$) or paranoid symptoms ($d=-1.24$) or who were in remission ($d=-0.692$).¹¹⁷ Other researchers found a negative relationship between the degree of delusions and performance on the Hinting Task¹¹⁸, as well as between the degree of persecution symptoms and outcomes on first- and second-degree false belief tasks.¹¹⁹

Similarly, in a series of studies, Hardy-Bayle's model has been verified, demonstrating that individuals with severe thinking and language disorganization perform poorly on ToM tasks.^{112,120} Patients without thinking and language disorganization, on the other hand, are largely unaffected on all ToM measures, according to her hypothesis, which does not appear to be the case. Mazza et al. (2001) studied ToM in 35 patients of schizophrenia using false belief and deception ToM stories and found that individuals with psychomotor retardation performed worse than disorganized patients.⁶ This provided only limited support for her hypothesis.

“Is schizophrenia a deficit or a trait?”

There continues a debate between theorists, whether impaired TOM causes the symptoms of schizophrenia or is simply a consequence of the illness i.e., is it a state or a trait? Some of the earlier studies have found that remitted schizophrenic patients perform well on hinting tasks and other false belief tasks as healthy controls.^{121,122} To support this finding, theorists have argued that during an acute exacerbation, the deficit in TOM get “turned on” and they get “turned off” during the remission phase. However, as the disease progresses and becomes chronic, the deficit may become more or less stable and constant.²⁴

However, some studies have contradicting results also. Janssen et al (2003), conducted a study to assess ToM deficits comparing 43 remitted schizophrenic patients with 43 healthy controls using hinting tasks and false belief stories. They

found that remitted group scored less than controls even after adjusting for IQ and neuropsychological factors like attention span, episodic memory, verbal fluency, speed and executive functions.¹²³

Similarly, Lakshmi et al (2017), performed a longitudinal study on 51 schizophrenic patients and compared their social cognition deficits in both symptomatic and remitted phase and observed that in both phases, patients performed poorly on TOM tasks as compared to the control group.¹²⁴ Mazza et al (2014), compared patients with chronic schizophrenia and first episode psychosis and found that there was no significant difference in the severity of TOM deficit and thus concluded that TOM is state-independent and not a byproduct of state of illness.¹²⁵

A few people have studied FDR of schizophrenic patients and have found that they too perform poorly when compared to healthy controls but better than the patient.^{25,126} These findings give more evidence that schizophrenia is a trait characteristic rather than state dependent.

Theory of mind - an endophenotype of schizophrenia?

Endophenotypes are biomarkers that reflect abnormal biochemical, neurophysiological, neuroanatomical, cognitive, and neuropsychological properties linked to genetic vulnerability for an illness. They must also be state-independent and present at a higher percentage in affected families than in the normal population.¹²⁷ As a result of the discovery that ToM impairments are present in schizophrenia, ToM has been evaluated if it is a cognitive endophenotype for use in genetic studies.¹²⁸

ToM as an endophenotype is supported by the fact that unaffected relatives have ToM deficits, that are intermediate between that of schizophrenia patients and healthy controls. Irani et al. (2006) looked at ToM deficits in first-degree relatives of patients with schizophrenia and found that relatives with high schizotypal scores on

the Schizotypal Personality Questionnaire (SPQ, (Raine 1991) had deficits that were midway between those with schizophrenia and those with control subjects.¹²⁹ Several other studies have also found similar results. Bora and Pantelis (2013) observed significant ToM impairment (Cohen's $d = 0.37$) among unaffected relatives of psychotic patients in a recent meta-analysis.¹¹⁰

There have been some other studies which have focused on neural activation associated with ToM in people who are at risk of developing schizophrenia. De Achaval et al. (2011) using functional magnetic resonance imaging (fMRI) observed that siblings who were genetically predisposed to schizophrenia had lower activity in areas connected with the ToM network in comparison to healthy controls.¹³⁰ David et al (2014) compared the neuronal activity of familial high risk (FHR) people with non-familial high risk (non-FHR) controls while providing them with a task to reason about a story character's emotions, physical appearance and thoughts. After that, participants filled out a 28-day online 'daily-diary' questionnaire in which they reported daily social interactions and ToM reasoning levels. When FHR participants reasoned about thoughts and emotions, they showed less brain activity in the bilateral temporoparietal junction. The findings suggested that vulnerability to schizophrenia is linked to ToM impairments.¹³¹ These family studies also strengthen the notion that ToM is a trait phenomenon and is not state dependent.

MATERIALS AND METHODS

The study was designed as a cross-sectional comparative study, aimed at assessing the theory of mind deficits in patients of schizophrenia attending tertiary care psychiatric unit and their first-degree relatives. The study was conducted at the out-patient unit of Department of Psychiatry at KLE's Dr. Prabhakar Kore Charitable Hospital, Nehru Nagar, Belagavi. Data collection took place between 1st January 2020 and 31st December 2020. Patients were recruited using purposive sampling.

The source of the sample were the patients who attended psychiatry OPD.

Sample size

Cases: 30

First degree relatives- 30

Healthy controls- 30

Sampling Procedure:

sample size was calculated using G-power software, with: alpha error- 5%

Power- 80%

Effect size- 0.37 (taken from a study done by Mehta et al (2014))⁷

The sample size according to this calculation is 75. A sample size of 90 was chosen in order to compensate for missing data.

Inclusion Criteria-

Cases-

1. Patients above the age of 18 years

2. Patients suffering from schizophrenia as diagnosed by criteria mentioned in International classification of diseases (ICD 10-DCR), who are asymptomatic or have had a stable course in the past 3 months,
3. MMSE (mini mental status examination) score >24
4. Availability of informed consent.

First degree relatives-

1. Above the age of 18 years
2. 1st degree relatives of the case.

Controls:

1. Above the age of 18 years
2. Age and sex matched to the cases

Exclusion criteria-

Cases:

1. Patients suffering from any other psychiatric illness or organic brain illness
2. Patients with substance abuse and dependence who come in a state of delirium or complicated withdrawal
3. Patients with diagnosed Intellectual disability

First degree relatives

1. People suffering from any psychiatric illness
2. People with substance abuse and dependence who come in a state of delirium or complicated withdrawal
3. People with diagnosed Intellectual disability

Controls:

1. People suffering from psychiatric illness

2. People with substance abuse and dependence who come in a state of delirium or complicated withdrawal

3. People with diagnosed Intellectual disability

Ethical Clearance

Prior to commencement, the ethical clearance was obtained from Institutional Ethics Committee, Jawaharlal Nehru Medical College, Belagavi. Ethical clearance number- MDC/DOME/296

Informed Consent

The relatives of patients who fulfilled the selection criteria were explained about the nature of the study and a written informed consent was obtained before enrolment.

TOOLS:

1) MINI: Mini International Neuropsychiatric Interview. The MINI is a short (15-30 minutes) structured diagnostic interview compatible with DSM-III-R/IV and ICD-10 criteria. It is designed for the clinical practice and research in psychiatric and primary care settings. It is available both in clinician rated (MINI-CR) and patient rated (MINI-PR) format. For this study MINI-CR English version 5.0.0 was used. It includes 16 disorders.¹³²

2) PANSS: Positive And Negative Syndrome Scale. PANSS (Kay et al., 1987) was developed to provide a well-defined instrument to specifically assess both positive and negative symptoms of schizophrenia as well as general psychopathology. Eighteen items of the Brief Psychiatric Rating Scale (Overall and Gorham, 1962) and twelve items of the Psychopathology Rating Schedule (Singh and Kay, 1975) were combined in one scale, and all items were given a complete definition as well

as detailed anchoring criteria for all rating points. It has strong psychometric properties in terms of reliability, validity and. It is the most widely used 30 item rating scales used for schizophrenia and psychotic spectrum disorder. Positive symptoms (7 items), negative symptoms (7 items) and general psychopathology (16 items).¹³³

3) SOCRATIS: Social Cognition Rating Tools in Indian Setting. It was designed to assess social cognition in the Indian cultural setting. It is an Indian adaptation of various tests that have been extensively used in social cognition research in schizophrenia. It has been validated in an Indian setting and has satisfactory psychometric properties. It assesses three domains of social cognition namely, theory of mind, attributional bias and social perception.⁷² The software was purchased after a training workshop held in NIMHANS, Bangalore. All tests of the SOCRATIS have good content validity. Theory of mind test includes adaptation of (a)two first order tasks: Sally-Anne and Smarties task, (b)two second order tasks: ice cream van and missing cookies story, (c)two metaphor and irony task and (d)faux pas recognition test. The scores (0-1) were generated by the software itself and divided into 3 categories –

- FOT – first order theory of mind
- SOT- second order theory of mind
- FPCI- Faux Pas composite index

4) MMSE: Mini-Mental State Examination is a brief test of cognitive impairment, developed by Folstein et al (1975), includes questions about orientation, attention, recall, and language. Galasko et al (1990) developed a shorter version of the test

(Modified MMSE) that is as sensitive as the complete test. It is a 30-point questionnaire, and a score of 23 is recommended as the cut-off score.¹³⁴

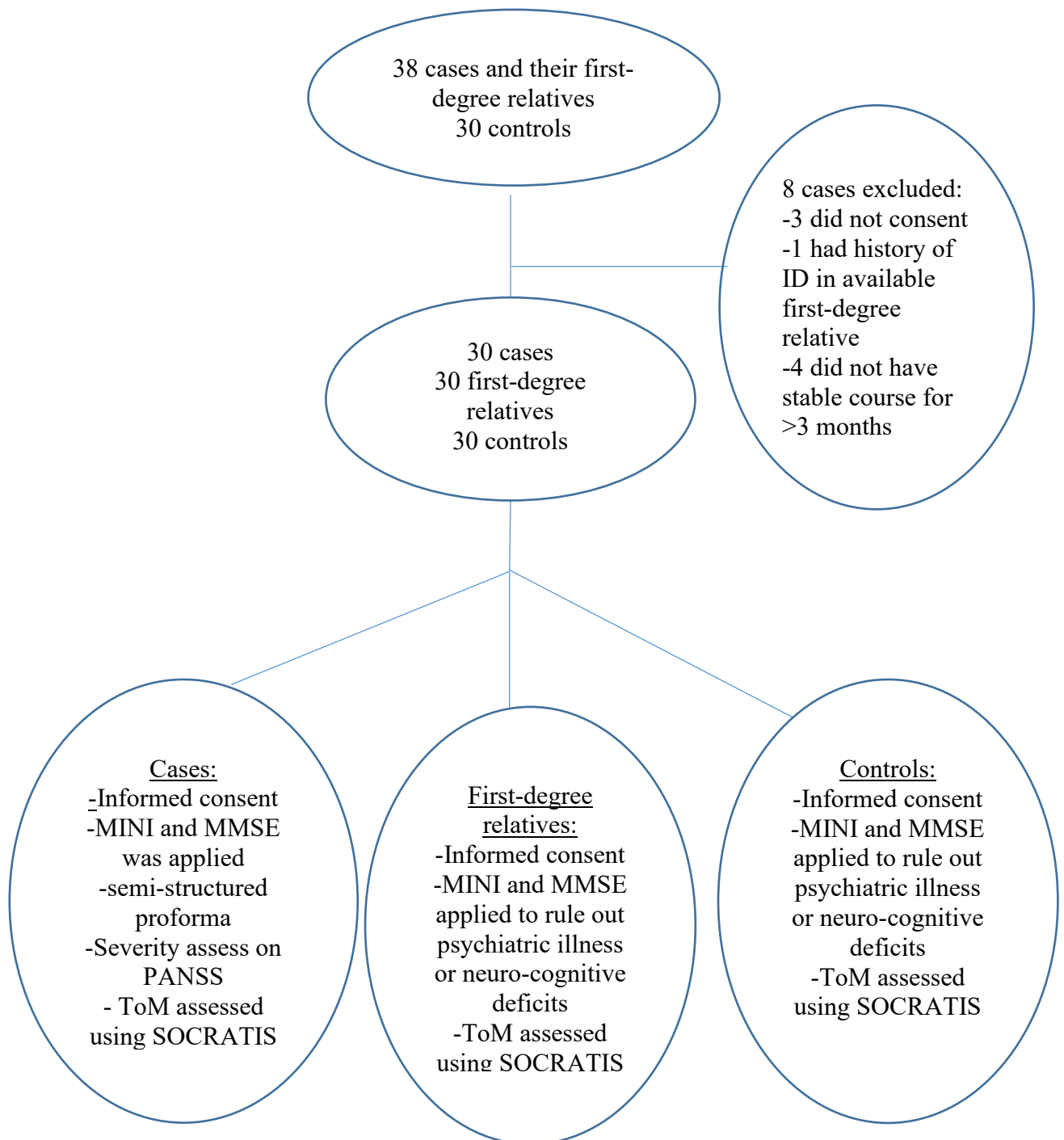
PROCEDURE:

The patients and attendants were explained regarding the study and its implications. A written informed consent from the patients was taken in their own vernacular language. Patients attending the psychiatry OPD who fulfilled the inclusion and exclusion criteria were interviewed. The diagnosis was confirmed using ICD 10-DCR criteria for schizophrenia. Basic socio-demographic data was collected based on a semi - structured proforma.

CASES: The participants were subjected to MINI and MMSE to rule out any other psychiatric illness and neuro-cognitive deficits. PANSS was applied to assess the severity of schizophrenia, and then SOCRATIS was applied to assess the deficits in theory of mind.

FIRST DEGREE RELATIVES: First degree relatives of the cases were subjected to MINI and MMSE to rule out any psychiatric illness or neuro cognition deficits if present. For subjects who fulfilled the inclusion and exclusion criteria, SOCRATIS was applied to measure theory of mind deficits.

HEALTHY CONTROLS: age and sex matched subjects of the cases were subjected to MINI and MMSE to rule out any psychiatric illness or neuro cognition deficits if present. For subjects who fulfilled the inclusion and exclusion criteria, SOCRATIS was applied to measure theory of mind deficits.



DATA ANALYSIS:

Data obtained was tabulated in Microsoft excel version 16.48 and subjected to appropriate statistical analyses. Descriptive statistics were presented as percentages for categorical variables, mean and standard deviation for continuous variables. The strength of association (p value) was calculated using unpaired t test or Mann-Whitney U test (non-parametric) or one-way ANOVA for continuous variables and Fisher's exact test or Chi-square test for categorical variables. All tests were 2-tailed tests. Statistical significance was set at p value less than 0.05.

RESULTS

38 cases that met the inclusion criteria were approached for the study. Out of the 38, 3 did not consent for participation, 1 had history of intellectual disability in the available first-degree relative and 4 did not have a stable course for more than 3 months. Hence, 8 were excluded from the study and final sample of 30 cases were taken along with their first degree relatives (30) and 30 healthy controls.

TABLE 1: Socio-demographic profile of the study sample

S.no.	Variables		Cases (n=30)	First degree relatives (n=30)	Controls (n=30)	p value
1	Age (Mean±SD)		35.5 ± 9.475	36.73 ± 11.39	34.13 ± 8.55	0.5961
2	Sex	Male	15 (50%)	15 (50%)	15 (50%)	0.1000
		Female	15 (50%)	15 (50%)	15 (50%)	
3	Socioeconomic Status	Upper Middle	10 (33.33%)	12 (40%)	12 (40%)	0.3782
		Lower Middle	20 (66.66%)	18 (60%)	18 (60%)	
4	Marital Status	Married	12 (40%)	13 (43.33%)	10 (33.33%)	1.033
		Divorced	1 (3.33%)	1 (3.33%)	2 (6.66%)	
		Widowed	2 (6.66%)	2 (6.66%)	2 (6.66%)	
		Unmarried	15 (50%)	14 (46.66%)	16 (53.33%)	

Table 1 shows the demographic profile of the cases, first degree relatives and healthy controls. Mean age in all the groups was comparable, 35.5 (\pm 9.475) years in cases, 36.73 (\pm 11.39) years in first degree relatives and 34.13 (\pm 8.55) years in controls. All three groups had equal number of males and females. Socioeconomic status was comparable in all three groups with more people belonging to lower middle class than upper middle class, 66.66% in cases, 60% in first degree relatives and 60% in controls. All the three groups had no significant difference in the marital status.

TABLE 2: Clinical profile of the Cases

S.no.	Variables		Observations (n=30)
1	Family history of any psychiatric disorder	Yes	11 (36.66%)
		No	19 (63.33%)
2	Family history of schizophrenia	Yes	8 (26.66%)
		No	22 (73.33%)
3	Type of schizophrenia	Paranoid schizophrenia	20 (66.66%)
		Undifferentiated schizophrenia	7 (23.33%)
		Hebephrenic schizophrenia	3 (10%)
4	Duration of illness in months (Mean±SD)		120.7 ± 102.8
5	Age of onset in years (Mean±SD)		25.43 ± 8.71
6	Duration of untreated psychosis in months (Mean±SD)		48.83 ± 53.52
7	PANSS Score (Mean±SD)	Positive	8.67 ± 3.57
		Negative	9.9 ± 5.3
		General psychopathology	17.7 ± 5.75
		Total score	35.26 ± 9.79
8	Number of hospitalisations	0	0 (0%)
		1-2	21 (70%)
		>2	9 (30%)
9	History of receiving ECTs	Yes	17 (56.66%)
		No	13 (43.33%)
10	Compliance*	Good	15 (50%)
		Poor	15 (50%)
11	MMSE (Mean±SD)		28.3 ± 1.70

ECT-Electro-Convulsive Therapy, PANSS- Positive and Negative Syndrome Scale

MMSE- Mini Mental State Examination

*Compliance was defined as 80% adherence to the prescribed medications.

FIGURE 3: DIAGNOSTIC SUBTYPES UNDER SCHIZOPHRENIA AS PER ICD-10 DCR IN THE STUDY SAMPLE (corresponding to table 1)

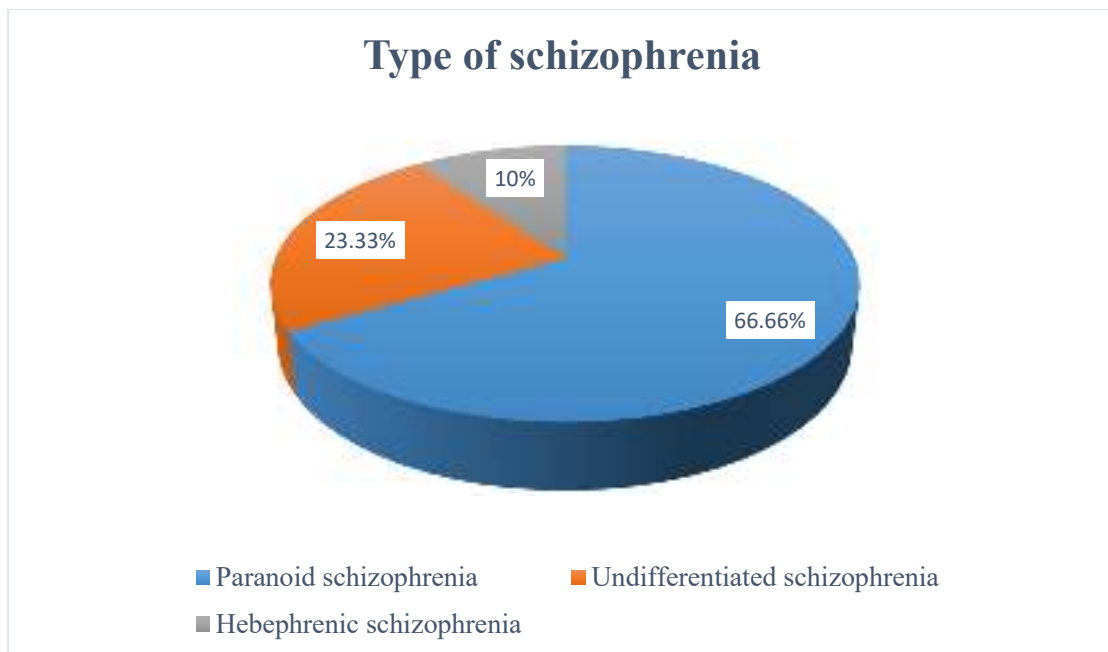


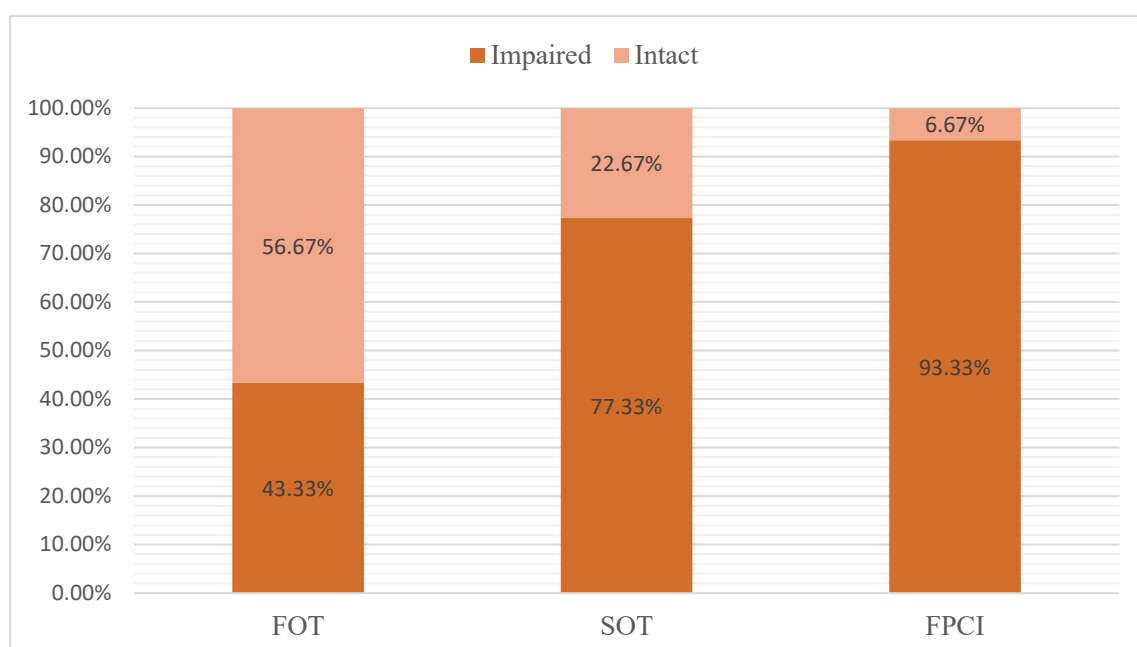
Table 2 shows the clinical characteristics of cases. According to table 2 and figure 3, the sample had higher proportion of paranoid schizophrenia (66.66%) as compared to undifferentiated schizophrenia (23.33%) and hebephrenic schizophrenia (10%). 36.66% of the cases had a positive family history of psychiatric condition and 26.66% had a positive family history of schizophrenia. The mean duration of illness was 120.7 (± 102.8) months and the mean age of onset was 25.43 (± 8.71) years. The mean duration of untreated psychosis in the cases was 48.83 (± 53.52) months. 70% has a history of 1-2 hospital admissions and 30% had been admitted more than 2 times. 56.66% has received electro-convulsive therapy in the past and 50% have been compliant to medication for more than 80% of the time. The mean total PANSS score was 35.26 (± 9.79), mean Positive score 8.67 (± 3.57) and mean Negative score was 9.9 (± 5.3).

TABLE 3: Proportion of Cases having impaired theory of mind

S.no.		Impaired ToM (n=30)*
1	1 st order theory of mind index	13 (43.33%)
2	2 nd order theory of mind index	22 (77.33%)
3	Faux Pas composite index	28 (93.33%)

*not mutually exclusive

FIGURE 4 PROPORTION OF CASES HAVING IMPAIRED THEORY OF MIND (corresponding to table 3)



FOT- First order theory of mind, SOT- Second order theory of mind, FPCI- Faux Pas composite index

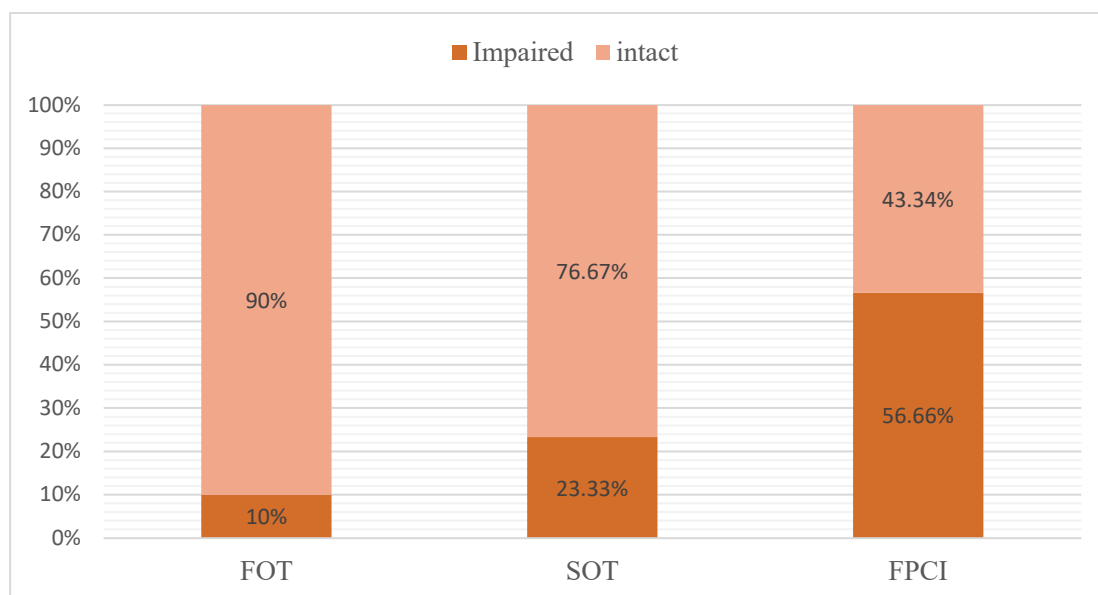
Table 3 and Figure 4 depict the proportion of cases who scored less than the cut off (1st order theory of mind = 1, 2nd order theory of mind = 0.650, Faux pas = 0.883). According to the table and figure, 43.33% cases were found to have deficit in first order theory of mind, 77.33% had deficit in second order theory of mind and 93.33% cases had deficit in faux pas.

TABLE 4: Proportion of First degree relatives having impaired theory of mind

S.no.		Impaired ToM* (n=30)
1	1 st order theory of mind index	3 (10%)
2	2 nd order theory of mind index	7 (23.33%)
3	Faux Pas composite index	17 (56.66%)

*not mutually exclusive

FIGURE 5 PROPORTION OF FIRST DEGREE RELATIVES HAVING IMPAIRED THEORY OF MIND (corresponding to table 4)



FOT- First order theory of mind, SOT- Second order theory of mind, FPCI- Faux Pas composite index

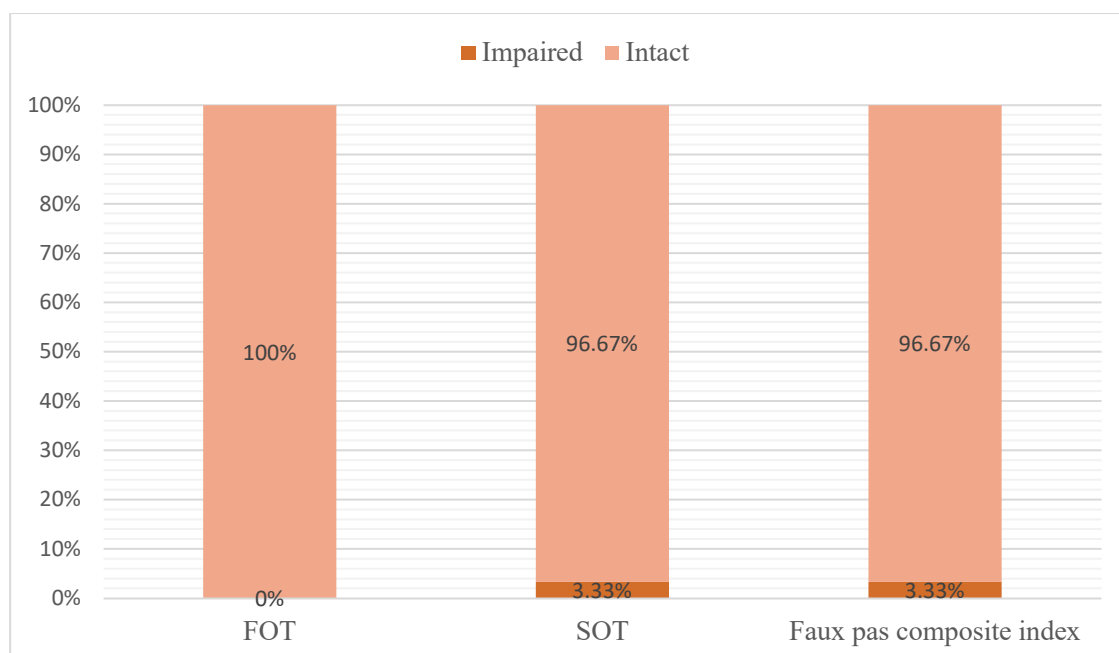
Table 4 and Figure 5 depict the proportion of first degree relatives that scored less than the cut off (1st order theory of mind = 1, 2nd order theory of mind = 0.650, Faux pas = 0.883). According to the table and figure, 10% first degree relatives were found to have deficit in first order theory of mind, 23.33% had deficit in second order theory of mind and 56.66% had deficit in faux pas.

TABLE 5: Proportion of healthy controls having impaired theory of mind

S.no.		Impaired ToM* (n=30)
1	1 st order theory of mind index	0 (0%)
2	2 nd order theory of mind index	1 (3.33%)
3	Faux Pas composite index	1 (3.33%)

*not mutually exclusive

FIGURE 6 PROPORTION OF CONTROLS HAVING IMPAIRED THEORY OF MIND (corresponding to table 5)



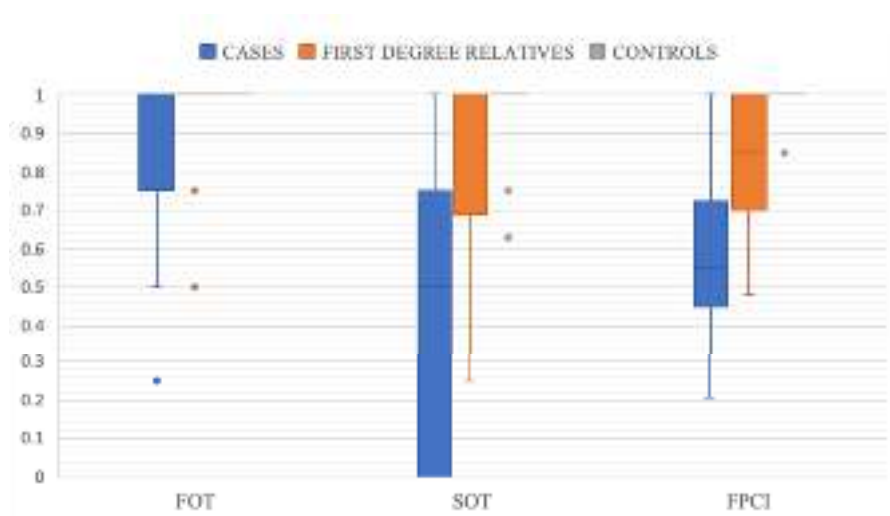
FOT- First order theory of mind, SOT- Second order theory of mind, FPCI- Faux Pas composite index

Table 5 and Figure 6 depict the proportion of controls that scored less than the cut off (1st order theory of mind = 1, 2nd order theory of mind = 0.650, Faux pas = 0.883). According to the table and figure, none of the controls were found to have deficit in first order theory of mind, however only 1 had deficit in second order theory of mind (3.33%) and 1 had deficit in faux pas (3.33%).

TABLE 6: Comparison of mean Theory of mind scores of cases, first degree relatives and controls.

S.no.	Theory of mind domain	Cases (Mean±SD)	First Degree Relatives (Mean±SD)	Controls (Mean±SD)	p value
1	1 st order theory of mind index	0.833 ± 0.23	0.966 ± 0.108	1	0.0001*
2	2 nd order theory of mind index	0.416 ± 0.349	0.833 ± 0.248	0.979 ± 0.08	0.0001*
3	Faux Pas composite index	0.562 ± 0.184	0.851 ± 0.152	0.98 ± 0.051	0.0001*

FIGURE 7 COMPARISON OF MEAN THEORY OF MIND SCORES OF CASES, FIRST DEGREE RELATIVES AND CONTROLS. (corresponding to table 6)



FOT- First order theory of mind, SOT- Second order theory of mind, FPCI- Faux Pas composite index

Table 6 and figure 7 show the comparison of mean score of all three domains of theory of mind between cases, FDR and controls. The difference was statistically

significant for all three domains (FOT p value=0.0001, SOT p value=0.0001, FPCI p value=0.0001).

However, after the post-hoc analysis, in first order theory of mind, Cases vs FDR p value was <0.01, cases vs control p value was <0.001 and FDR vs control p value was >0.05, which was not significant. Similarly for second order theory of mind, Cases vs FDR p value was <0.01, cases vs control p value was <0.001 and first degree relatives vs control p value was >0.05, which was not significant. For Faux Pas, Cases vs FDR p value was <0.001, cases vs control p value was <0.001 and FDR vs control p value was <0.01, all of which were significant.

Cases performed the worst in all three domains, FDR performed poorer than controls in only Faux pas whereas controls performed the best.

TABLE 7: Comparison of socio-demographic characteristics of cases, between those with intact 1st order theory of mind and those with impaired 1st order theory of mind

S.no.	Variables		Intact 1 st order theory of mind (n= 17)	Impaired 1 st order theory of mind (n= 13)	p value
1	Age (Mean±SD)		35.11 ± 10.18	36 ± 8.84	0.6290
2	Sex	Male	8 (47.05%)	7 (53.84%)	1.0000
		Female	9 (52.94%)	6 (46.15%)	
3	Socioeconomic Status	Upper Middle	6 (35.29%)	4 (30.76%)	1.0000
		Lower Middle	11 (64.7%)	9 (69.23%)	
4	Education in years (Mean±SD)		8.64 ± 4.13	8.30 ± 5.39	0.8461
5	Occupation	Employed	4 (23.52%)	2 (15.38%)	0.5429
		Unemployed	7 (41.17%)	8 (61.53%)	
		Homemaker	6 (35.29%)	3 (23.07%)	
6	Marital Status	Married	8 (47.05%)	4 (30.76%)	0.5933
		Divorced	1 (5.88%)	0	
		Widowed	1 (5.88%)	1 (7.69%)	
		Unmarried	7 (41.17%)	8 (61.53%)	

Table 7 shows comparison of demographic details of cases who had intact first order theory of mind and those who had impaired first order theory of mind as per SOCRATIS. There was no significant difference between the two groups with regards to age, sex, socio-economic status, education in years, occupation and marital status. There was a higher proportion on married people with intact first order theory of mind (47.05% vs 30.76%). In the impaired group, there were more unmarried (61.53% vs 41.17%) and unemployed people (61.53% vs 41.17%).

TABLE 8: Comparison of socio-demographic characteristics of cases, between those with intact 2nd order theory of mind and those with impaired 2nd order theory of mind

S.no.	Variables		Intact 2 nd order theory of mind (n= 8)	Impaired 2 nd order theory of mind (n= 22)	p value
1	Age (Mean±SD)		33.25 ± 5.7	36.31 ± 10.51	0.4436
2	Sex	Male	6 (75%)	9 (40.9%)	0.2148
		Female	2 (25%)	13 (59.09%)	
3	Socioeconomic Status	Upper Middle	2 (25%)	8 (36.36%)	0.6821
		Lower Middle	6 (75%)	14 (63.63%)	
4	Education in years (Mean±SD)		9.5 ± 3.96	8.13 ± 4.89	0.4837
5	Occupation	Employed	4 (50%)	2 (9.09%)	0.0415*
		Unemployed	2 (25%)	13 (59.09%)	
		Homemaker	2 (25%)	7 (31.81%)	
6	Marital Status	Married	4 (50%)	8 (36.36%)	0.7141
		Divorced	0	1 (4.54%)	
		Widowed	0	2 (9.09%)	
		Unmarried	4 (50%)	11 (50%)	

Table 8 shows comparison between demographic details of cases who had intact second order theory of mind and those who had impaired second order theory of mind as per SOCRATIS. Cases with impaired second order theory of mind had more number of unemployed people (59.09% vs 25%) and home makers (31.81% vs 25%). This difference was statistically significant (p=0.0415). There was no significant difference between the two groups with regards to age, sex, socio-economic status, education in years and marital status.

TABLE 9: Comparison of socio-demographic characteristics of cases, between those with intact Faux Pas and those with impaired Faux Pas

S.no.	Variables		Intact Faux pas (n= 2)	Impaired Faux pas (n= 28)	p value
1	Age (Mean±SD)		30 ± 7.07	35.89 ± 9.6	0.4052
2	Sex	Male	1 (50%)	14 (50%)	1.5172
		Female	1 (50%)	14 (50%)	
3	Socioeconomic Status	Upper Middle	0	10 (35.71%)	0.5402
		Lower Middle	2 (100%)	18 (64.28%)	
4	Education in years (Mean±SD)		9 ± 1.41	8.46 ± 4.79	0.8767
5	Occupation	Employed	0	6	0.6997
		Unemployed	1 (50%)	14	
		Homemaker	1 (50%)	8	
6	Marital Status	Married	0	12 (42.85%)	0.5433
		Divorced	0	1 (3.57%)	
		Widowed	0	2 (7.14%)	
		Unmarried	2 (100%)	13 (46.42%)	

Table 9 shows comparison between demographic details of cases who had intact Faux Pas and those who had impaired Faux Pas as per SOCRATIS. There was no significant difference between the two groups with regards to age, sex, socio-economic status, education in years, occupation and marital status.

TABLE 10: Association of clinical characteristics of cases with those with intact 1st order theory of mind and those with impaired 1st order theory of mind

S.no.	Variables		Intact 1 st order theory of mind (n= 17)	Impaired 1 st order theory of mind (n= 13)	p value
1	Family history of any psychiatric disorder	Yes	5 (11.76%)	6 (46.15%)	0.4539
		No	12 (70.58%)	7 (53.84%)	
2	Family history of schizophrenia	Yes	4 (23.52%)	4 (30.76%)	0.6976
		No	13 (76.47%)	9 (69.23%)	
3	Type of schizophrenia	Paranoid schizophrenia	12 (70.58%)	8 (61.53%)	0.6851
		Undifferentiated schizophrenia	4 (23.52%)	3 (23.07%)	
		Hebephrenic schizophrenia	1 (5.88%)	2 (15.38%)	
4	Duration of illness in months (Mean±SD)		104.41 ± 128.02	142 ± 53.26	0.06
5	Age of onset in years (Mean±SD)		26.52 ± 9.75	24 ± 7.26	0.304
6	Duration of untreated psychosis in months (Mean±SD)		34.05 ± 52.51	68.15 ± 50.3	0.01*
8	Number of hospitalisations	0	0	0	0.4434
		1-2	13 (76.47%)	8 (61.53%)	
		>2	4 (23.52%)	5 (38.46%)	
9	History of receiving ECTs	Yes	10 (58.82%)	7 (53.84%)	1.0000
		No	7 (41.17%)	6 (46.15%)	
10	Compliance	Good	9 (52.94%)	6 (46.15%)	1.0000
		Poor	8 (47.05%)	7 (53.84%)	
11	MMSE (Mean±SD)		28.64 ± 1.45	28.35 ± 1.74	0.6244

ECT-Electro-Convulsive Therapy, PANSS- Positive And Negative Syndrome Scale
MMSE- Mini Mental State Examination

Table 10 shows comparison of clinical characteristics between cases with intact first order theory of mind and impaired first order theory of mind. Cases with impaired group were seen to have a longer duration of untreated psychosis (68.15 ± 50.3 vs 34.05 ± 52.51 months), this value was statistically significant (p value-0.01). Impaired group also had longer duration of illness (142 ± 53.26 vs 104.41 ± 128.02 months) and younger onset of illness (24 ± 7.26 vs 26.52 ± 9.75 years), however these differences were not statistically significant but a trend significance was seen for duration of illness ($p= 0.06$). Cases with a positive family history of any psychiatric illness were found more in the impaired group than the intact group (46.15% vs 11.76%), however this finding was not statistically significant. Group with intact first order theory of mind that more cases with a diagnosis of paranoid schizophrenia than the impaired group (70.58% vs 61.53), however this finding was not statistically significant. There was significant difference between the intact and impaired group in respect to family history of schizophrenia, number hospitalizations, history of receiving ECTs and compliance.

Table 11: Association of clinical characteristics of cases with those with intact 2nd order theory of mind and those with impaired 2nd order theory of mind

S.no.	Variables	Intact 2 nd order theory of mind (n= 8)	Impaired 2 nd order theory of mind (n= 22)	p value	
1	Family history of any psychiatric disorder	Yes	2 (25%)	9 (40.9%)	0.6722
		No	6 (75%)	13 (59.09%)	
2	Family history of schizophrenia	Yes	2 (25%)	6 (27.27%)	1.0000
		No	6 (75%)	16 (72.72%)	
3	Type of schizophrenia	Paranoid schizophrenia	7 (87.5%)	13 (59.09%)	0.3088
		Undifferentiated schizophrenia	1 (12.5%)	6 (27.27%)	
		Hebephenic schizophrenia	0	3 (13.63%)	
4	Duration of illness in months (Mean±SD)	45.62 ± 83.84	148 ± 96.6	0.004*	
5	Age of onset in years (Mean±SD)	30.87 ± 6.51	23.45 ± 8.68	0.02*	
6	Duration of untreated psychosis in months (Mean±SD)	8.75 ± 9.39	63.4 ± 55.61	0.002*	
8	Number of hospitalisations	0	0	0	0.0665
		1-2	8 (100%)	13 (59.09%)	
		>2	0	9 (40.9%)	
9	History of receiving ECTs	Yes	4 (50%)	13 (59.09%)	0.6976
		No	4 (50%)	9 (40.9%)	
10	Compliance	Good	5 (62.5%)	10 (45.45%)	0.6817
		Poor	3 (37.5%)	12 (54.54%)	
11	MMSE (Mean±SD)	28.37 ± 5.7	28.27 ± 1.804	0.9411	

ECT-Electro-Convulsive Therapy, PANSS- Positive And Negative Syndrome Scale

MMSE- Mini Mental State Examination

FIGURE 8 COMPARISON OF CLINICAL CHARACTERSTICS BETWEEN CASES WITH INTACT AND IMAPIRED SECOND ORDER THEORY OF MIND (corresponding to table 11)

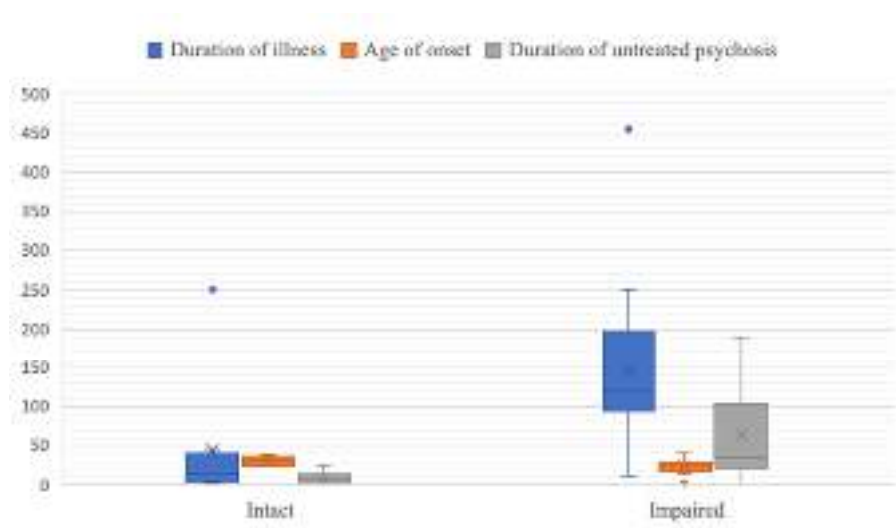


Table 11 shows comparison of clinical characteristics between cases with intact second order theory of mind and impaired second order theory of mind. Impaired group had a longer duration of illness (148 ± 96.6 vs 45.62 ± 83.84 months; p value= 0.004) , younger onset of illness (23.45 ± 8.68 vs 30.87 ± 6.51 years; p value= 0.02) and longer duration of untreated psychosis (63.4 ± 55.61 vs 8.75 ± 9.39 months; p value= 0.002) and these differences were statistically significant. (figure 6)

The impaired group had higher percentage of positive family history of any psychiatric illness (40.9% vs 25%), cases with poor compliance (54.54% vs 37.5%) and had higher proportion of undifferentiated (27.27% vs 12.5%) and hebephrenic schizophrenia (13.36% vs 0%), while on the other hand the intact group had a higher proportion of paranoid schizophrenia (87.5% vs 59.09%). However, these differences were not statistically significant. There was no significant difference between the intact and impaired group in respect to family history of schizophrenia and history of receiving ECTs.

TABLE 12: Association of clinical characteristics of cases with those with intact Faux pas and those with impaired Faux pas

S.no.	Variables		Intact Faux Pas (n= 2)	Impaired Faux Pas (n= 28)	p value
1	Family history of any psychiatric disorder	Yes	1 (50%)	10 (35.71%)	1.0000
		No	1 (50%)	18 (64.28%)	
2	Family history of schizophrenia	Yes	1 (50%)	7 (25%)	0.5128
		No	1 (50%)	21 (75%)	
3	Type of schizophrenia	Paranoid schizophrenia	2 (100%)	18 (64.28%)	0.5853
		Undifferentiated schizophrenia	0	7 (25%)	
		Hebephrenic schizophrenia	0	3 (10.71%)	
4	Duration of illness in months (Mean±SD)		10.5 ± 10.6	128.57 ± 101.93	0.02*
5	Age of onset in years (Mean±SD)		29 ± 8.48	25.17 ± 8.82	0.600
6	Duration of untreated psychosis in months (Mean±SD)		6 ± 8.48	51.89 ± 54.12	0.104
8	Number of hospitalisations	0	0	0	1.0000
		1-2	2 (100%)	19 (67.85%)	
		>2	0	9 (32.14%)	
9	History of receiving ECTs	Yes	1 (50%)	16 (57.14%)	1.0000
		No	1 (50%)	12 (42.85%)	
10	Compliance	Good	1 (50%)	14 (50%)	1.5172
		Poor	1 (50%)	14 (50%)	
11	MMSE (Mean±SD)		27.5 ± 0.707	28.35 ± 1.74	0.4986

ECT-Electro-Convulsive Therapy, PANSS- Positive And Negative Syndrome Scale
MMSE- Mini Mental State Examination

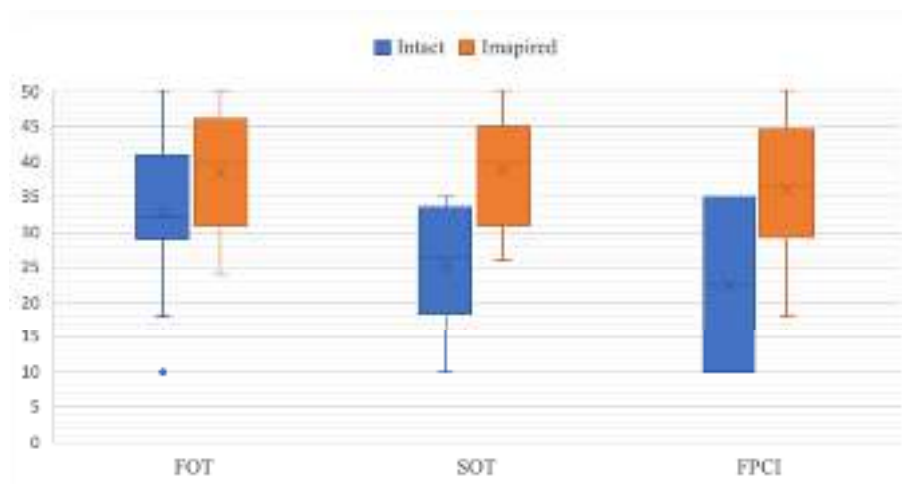
Table 12 shows comparison between clinical characteristics of cases who had intact Faux Pas and those who had impaired Faux Pas as per SOCRATIS. Impaired group had a longer duration of illness and this value was statistically significant (148 ± 96.6 vs 45.62 ± 83.84 months; p value= 0.02). Besides this, there was no significant difference between the two groups with regards to family history, type of schizophrenia, age of onset, duration of untreated psychosis, number of hospitalizations, history of receiving ECTs, compliance and MMSE scores.

TABLE 13: Comparison of mean total PANSS scores between cases with intact theory of mind and impaired theory of mind

S.no.	Theory of mind domain	PANSS total score		p value
		intact theory of mind (mean ± SD)	impaired theory of mind (mean ± SD)	
1	1 st order theory of mind index	32.88 ± 10.28	36.03 ± 8.97	0.1108
2	2 nd order theory of mind index	25.25 ± 8.82	38.90 ± 7.36	0.0002*
3	Faux Pas composite index	20 ± 14.14	35.78 ± 9.11	0.0285*

PANSS- Positive and Negative Syndrome Scale

FIGURE 9 COMPARISON OF MEAN TOTAL PANSS SCORES BETWEEN CASES WITH INTACT THEORY OF MIND AND IMPAIRED THEORY OF MIND (corresponding to table 13)



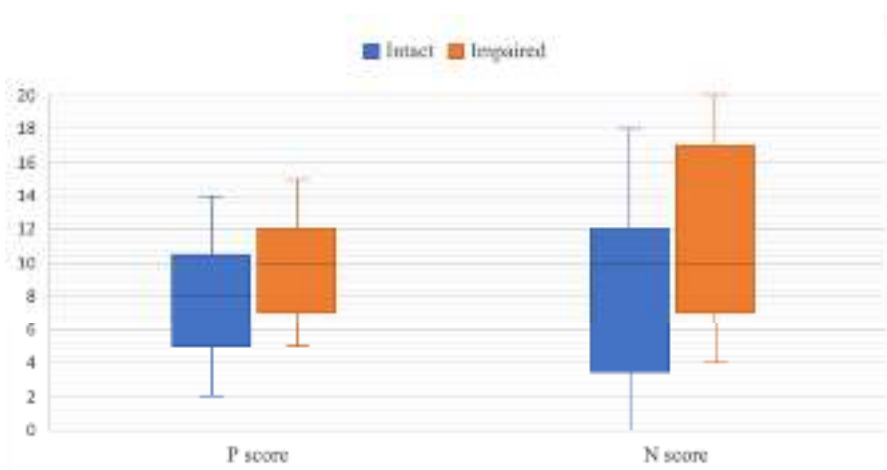
FOT- First order theory of mind, SOT- Second order theory of mind, FPCI- Faux Pas composite index

Table 13 and figure 9 shows comparison between mean total PANSS scores between cases who had intact theory of mind and cases who had impaired theory of mind. Total PANSS scores were found to be more in impaired group in all three domains of theory of mind assessed according to SOCRATIS, however, values were only significant for second order theory of mind and Faux pas (p value= 0.0002; p value= 0.0285 respectively).

TABLE 14: Comparison of mean Positive And Negative PANSS scores between cases with intact theory of mind and impaired theory of mind

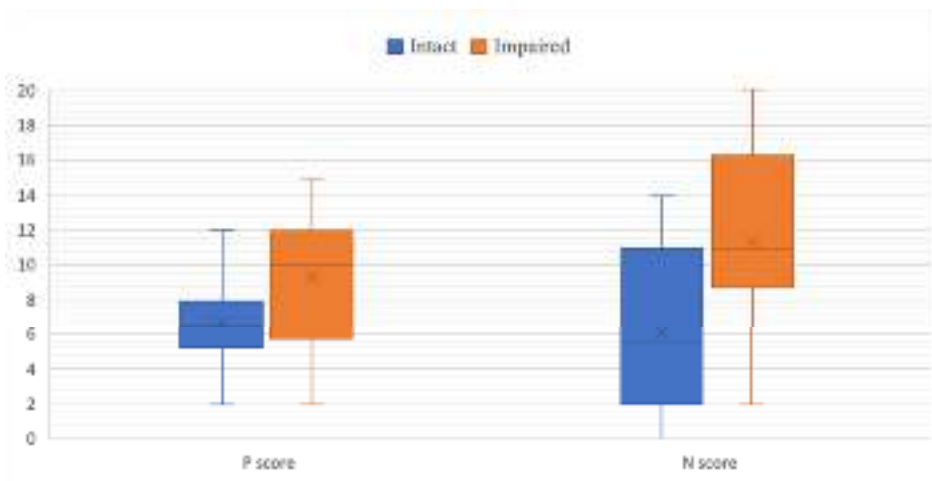
S.no.		Intact 1 st order theory of mind (n= 17)	Impaired 1 st order theory of mind (n= 13)	p value
1	Positive score	7.76 ± 3.71	9.84 ± 3.105	0.1143
2	Negative score	8.58 ± 5.02	11.61 ± 5.28	0.1203
		Intact 2 nd order theory of mind (n= 8)	Impaired 2 nd order theory of mind (n= 22)	p value
1	Positive score	6.75 ± 2.86	9.36 ± 3.59	0.0753
2	Negative score	6.12 ± 4.96	11.27 ± 4.77	0.0151*
		Intact Faux pas composite index (n= 2)	Impaired Faux pas composite index (n= 28)	p value
1	Positive score	5 ± 4.24	8.92 ± 3.45	0.1425
2	Negative score	6 ± 8.49	10.17 ± 5.09	0.2870

FIGURE 10 COMPARISON OF MEAN POSITIVE AND NEGATIVE PANSS SCORES BETWEEN CASES WITH INTACT AND IMPAIRED FIRST ORDER THEORY OF MIND (corresponding to table 14)



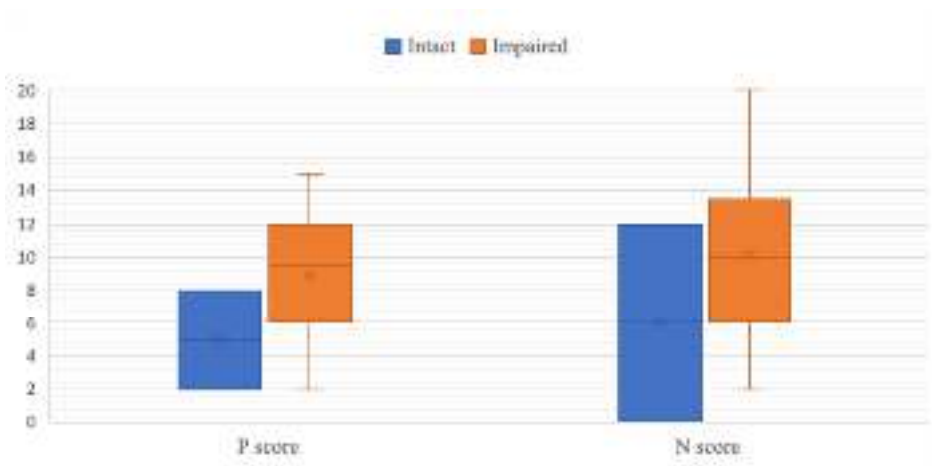
P- Positive score, N- Negative score

FIGURE 11 COMPARISON OF MEAN POSITIVE AND NEGATIVE PANSS SCORES BETWEEN CASES WITH INTACT AND IMAPIRED SECOND ORDER THEORY OF MIND (corresponding to table 14)



P- Positive score, N- Negative score

FIGURE 12 COMPARISON OF MEAN POSITIVE AND NEGATIVE PANSS SCORES BETWEEN CASES WITH INTACT AND IMAPIRED FAUX PAS (corresponding to table 14)



P- Positive score, N- Negative score

Table 14 and figure 10-12 shows comparison between mean Positive and Negative PANSS scores between cases who had intact theory of mind and cases who had impaired theory of mind. Both Positive and Negative PANSS scores were found to be more in impaired group in all three domains of theory of mind assessed according to SOCRATIS, however, values were only significant for difference between the Negative scores in second order theory of mind (p value= 0.0151).

DISCUSSION

Patients of schizophrenia in the long term suffer from poor social and occupational functioning. Cognitive impairments are one of the main domains affected in schizophrenia. As compared to Neuro-cognition, Social Cognition has only recently come to light as the neuronal network involved in processing of social information is being more and more researched.

Our study assessed the prevalence of theory of mind deficits in patients of schizophrenia and their FDRs and compared them to healthy controls. The mean age of cases, FDR and controls were comparable, 35.5 years, 36.73 years and 34.13 years respectively. All the three groups had equal number of males and females, slightly higher proportion belonging to lower middle class and were unmarried. It was found that in cases, 43.33% had first order ToM deficit, 77.33% had second order ToM deficit and 93.33% cases had deficit in faux pas, in FDRs 10% had deficit in first order ToM, 23.33% had deficit in second order ToM and 56.66% had deficit in faux pas whereas none of the controls were found to have deficit in first order ToM, however only 1 had deficit in second order ToM (3.33%) and 1 had deficit in faux pas (3.33%). Thus, Cases performed the worst in all three domains, FDR performed poorer than controls in only Faux pas whereas controls performed the best in all three domains.

Higher the severity of illness and more negative symptoms were associated with higher ToM deficit.

1. PREVELANCE OF THEORY OF MIND DEFICIT IN PATIENTS WITH SCHIZOPHRENIA

To assess the theory of mind in patients, Social Cognition Rating Tools in Indian Setting (SOCRATIS) was used. It is a culturally adapted tool to assess social cognition in Indian setting that measures three domains namely, ToM, social perception and attributional style. Out of which, ToM was measured based on the performance of participants in different domains i.e., first order ToM task, second order ToM task and Faux pas. If deficit was found in anyone domain out of the three, theory of mind was said to be impaired. The cut offs for each were taken from the study done by Mehta et al (2013)¹³⁵.

In this study it was seen that in patients with schizophrenia (cases), 43.33% patients scored below the cut off (=1) in first order theory of mind task, 77.33% of patients scored below the cut off (=0.650) in second order theory of mind task and 93.33% patients scored below the cut off (=0.883) in Faux Pas task. (refer to table 3)

Study done by Mazza et al (2001) to assess theory of mind in 35 schizophrenic patients compared with healthy controls and found that 45% and 54% of patients could not perform the two first order theory of mind task and 43% and 35% couldn't perform second order theory of mind task.⁶ Mehta et al (2014) studied social cognition deficits in schizophrenic patients in remission and found that 35%, 76.66% and 91.66% performed poorly as compared to healthy controls in first order, second order theory of mind and Faux Pas task respectively⁷. Janssen et al (2003) found that in 43 patients in remission, 46.5% patients performed poorly on hinting task and 17.7% patients performed poorly on first order false belief task¹²³.

Our study found similar results as compared to the studies mentioned above. These findings also support the hypothesis that since theory of mind deficits are

present in remission also, they are a state independent and is a trait marker of schizophrenia. Also, it was seen that higher the order of ToM, higher was the deficit.

2. PREVELANCE OF THEORY OF MIND DEFICIT IN FIRST DEGREE RELATIVES OF PATIENTS WITH SCHIZOPHRENIA COMAPRED TO CASES AND CONTROLS.

SOCRATIS was used to assess the theory of mind deficits in patient's first degree relative and healthy controls. Our study found that 10% of first-degree relatives scored below the cut off in first order task, 23.33% scored below the cutoff in second order task and 56.66% scored below the cut off in faux pas. (refer to table 4). In controls, none scored below the cutoff in first order task, however only 3.33% scored below cut off in both second order and Faux Pas. (refer to table 5)

D de Achával (2010) measured ToM in 20 patients with schizophrenia, their 20 unaffected FDR and 20 healthy age- and gender-matched individuals and found that Relatives performed poorly as compared to controls in Faces test and Reading the Mind in the Eyes Test ($p = 0.048$ and $p = 0.046$ respectively) and the detection of social Faux Pas (0.8 ± 0.2 vs. controls: 0.93 ± 0.09 , $p = 0.024$). However they did not compare results between patients and FDRs.¹³⁶

In our study when we compared the mean score of all three domains of ToM of cases, FDRs and controls, the difference was statistically significant for all three domains (FOT p value=0.0001, SOT p value=0.0001, FPCI p value=0.0001). After the Post-hoc analysis, in first and second order ToM, only difference between cases and FDR (p value <0.01); cases and control (p value was <0.01), were significant. However, in Faux Pas, all three differences i.e., Cases vs FDR (p value was <0.001), cases vs control (p value was <0.001) and FDR vs control (p value was <0.01) were

significant. (refer to table 6) Meaning that cases performed the worst, FDR performed intermediate and healthy controls performed the best.

Rukiye AY (2016) found similar findings as ours. They tried to detect ToM deficits in 30 patients of schizophrenia, 30 FDRs and 30 healthy volunteers who were age and education matched. Dokuz-Eylül Theory of Mind Scale (DEToMS) and Reading the Mind in the Eyes test was applied. They found that the schizophrenia group performed the worst, controls the best and FRDs intermediate. The difference between all three groups in the first-order false belief subscale and the total DEToMS score was significant. In second-order false belief, metaphor, and faux pas tests difference between patients and FDRs was not significant but between FDRs and control was significant.¹³⁷ Our findings are in line with the above studies done on first degree relatives of patients of schizophrenia mentioned.

However, Kelemen et al (2004) found contradicting findings that there is no difference between the performance of controls and FDRs on ToM tasks. This inconsistency can be explained by the test used by them; the eyes test in which the participants have to infer mental states from looking at pictures of eyes.¹³⁸ The component being tested by this test appears to be different from what its intended to assess, perhaps measuring emotional recognition abilities or empathy more than ToM.

3. DEMOGRAPHIC AND CLINICAL FACTORS AFFECTING THEORY OF MIND DEFICITS

Demographic factors-

First order TOM- (refer to table 7)

In our study, the group with impaired first order theory of mind had a greater number of unemployed and unmarried people in the impaired group. However, these

findings were not statistically significant. People with ToM deficits are bound to have poor overall social cognition and can be more vulnerable to poor social relations and work performance. This might explain the greater number of unemployed and unmarried people in the impaired group.

Second order TOM- (refer to table 8)

We found that the impaired group had a higher proportion of unemployed people as compared to the intact group (59.09% vs 25%; p value= 0.0415) and this difference was statistically significant. Besides these parameters, there was not much difference between both the groups based on age, socioeconomic status, marital status or education.

Lakshmi V et al (2017) using SOCRATIS found similar findings that second order ToM was more impaired in those who were not on paid employment.¹²⁴

Faux pas- (refer to table 9)

There was no significant difference between the two groups with regards to age, sex, socio-economic status, education in years, occupation and marital status. However since one of the group (intact) was very small as compared to the impaired group, the values were not comparable.

There have been mixed results in the past. Few studies like Marjoram et al (2005)¹³⁹, Raju V et al (2019)¹⁴⁰ have found no relation between ToM performance and sociodemographic details, on the other hand, Lakshmi V et al (2017) using SOCRATIS found that second order ToM was more impaired in older patients and males. Males also had more impairment in Faux Pas.¹²⁴ Some of our findings are in line with this study, as in our study second order was more impaired in unemployed patients.

Clinical factors-**First order ToM- (refer to table 10)**

In our study, we found that cases with impaired group were seen to have a longer duration of untreated psychosis (68.15 ± 50.3 vs 34.05 ± 52.51 months), this value was statistically significant (p value=0.01). Impaired group also had longer duration of illness (142 ± 53.26 vs 104.41 ± 128.02 months) and younger onset of illness (24 ± 7.26 vs 26.52 ± 9.75 years), however these differences were not statistically significant but a trend significance was seen for duration of illness ($p=0.06$). Cases with a positive family history of any psychiatric illness were found more in the impaired group than the intact group (46.15% vs 11.76%), however this finding was not statistically significant. Group with intact first order theory of mind that more cases with a diagnosis of paranoid schizophrenia than the impaired group (70.58% vs 61.53), however this finding was not statistically significant. There was significant difference between the intact and impaired group in respect to family history of schizophrenia, number hospitalizations, history of receiving ECTs and compliance.

Second order ToM- (refer to table 11)

Based on the results of our study, we found that there were higher proportion of cases with positive family history of any psychiatric disorder in the impaired group (40.9% vs 25%), however, this difference was not statistically significant. It was also observed that cases with a diagnosis of paranoid schizophrenia had comparatively intact second order theory of mind (87.5% vs 59.09%), whereas cases with a diagnosis of undifferentiated performed poorly on second order theory of mind task (27.27% vs 12.5%) and all cases with hebephrenic schizophrenia had impaired second order theory of mind. However, these findings were not statistically significant.

It was also found that cases who had impaired second order, had a longer duration of illness (148 ± 96.6 vs 45.62 ± 83.84 months; p value= 0.004), had a younger age of onset of schizophrenia (23.45 ± 8.68 vs 30.87 ± 6.51 years; p value= 0.02) and had a longer duration of untreated psychosis (63.4 ± 55.61 vs 8.75 ± 9.39 months, p value= 0.002) and all these three differences were statistically significant.

Faux Pas- (refer to table 12)

In our study, impaired group had a longer duration of illness and this finding was statistically significant (148 ± 96.6 vs 45.62 ± 83.84 months; p value= 0.02). Besides this, there was no significant difference between the two groups with regards to family history, type of schizophrenia, age of onset, duration of untreated psychosis, number of hospitalizations, history of receiving ECTs, compliance and MMSE scores. However since one of the group (intact) was very small as compared to the impaired group, the values were not comparable.

Lakshmi V et al (2017) studied social cognition in 51 patients of schizophrenia and found that longer duration of illness was associated with more impaired second order ToM.¹²⁴ Bure et al (2017) and a meta-analysis conducted by Bora et al (2008) also found that patients with longer duration had more impairments on ToM task however, age of onset did not have a significant relationship with ToM deficit.^{141,142}

In our study we found that patients with longer duration of illness had more impaired second order ToM. Unlike the studies mentioned above, we also found that earlier the age of onset, more was the impairment in second order ToM. The studies mentioned above had a later mean age of onset and since duration of illness has a positive relation with second order ToM, considering the point of assessment, they might have not found a significant relation between age of onset and ToM.

Besides a few, not many studies have tried to find the relation between duration of untreated psychosis (DUP) and ToM but the ones who have tried, have found no relation between them. However, our study found a positive relation between second order ToM and DUP. Xiang et al (2016) assessed social cognition in 122 patients but found no relation¹⁴³, however, their mean DUP was 256 days which as compared to our study is very less.

PANSS score- (refer to table 13 and 14)

When the mean PANSS scores were compared to various domains of theory of mind, it was found that the mean total score was more in impaired group. Out of the three domains, the differences were statistically significant for second order theory of mind (38.90 ± 7.36 vs 25.25 ± 8.82 ; p value=0.0002) and Faux Pas (35.78 ± 9.11 vs 20 ± 14.14 ; p value= 0.0285).

There exists a discord between studies. Some have concluded that there is no association between any specific symptoms of schizophrenia and ToM deficits like Bonshtein et al (2006) in their study on 41 patients of schizophrenia found no significant correlation between any of the ToM measures and the symptoms' presentation as measured by the PANSS.¹⁴⁴ However, Lakshmi V et al (2017) using SOCRATIS found significant relation between PANSS negative score and second order ToM.¹²⁴ Some suggest that patients with highly disorganized thoughts, language and behavior, higher severity of symptomatology and negative symptoms are associated with poorer performance on ToM tasks.^{145,146}

STRENGTHS OF THE STUDY-

1. As compared to Neuro-cognition, Social cognition and thus theory of mind is a recent concept that has been emerging in the past few decades in respect to schizophrenia. There have been mixed results in the past if theory of mind is a state or a trait of schizophrenia. Our study adds on to the existing debate in favor of it being a trait.
2. Apart from assessing the prevalence of ToM in schizophrenic patients, an attempt to measure ToM in their first-degree relatives was also made which adds on to the existing literature and provides more evidence that ToM can be an endophenotype.
3. The tool used in this study to measure ToM (SOCRATIS) is culturally adapted to Indian setting and has high inter-rater reliability and validity.

LIMITATIONS OF THE STUDY-

1. The sample size of the study could have been still greater to have a greater insight into the correlation between clinical correlates and Faux Pas deficits.
2. In our study we tried to exclude patients with NC deficits by using MMSE, however better measures to adjust for NC could have been used and NC deficits might confound the results.
3. Correlation psychotropics and other medications with ToM deficits could have been taken into account.

CONCLUSION

The study shows that patients with schizophrenia in remission have theory of mind deficits (43.33% in first order, 77.33% second order and 93.33% in Faux Pas). These deficits are present even during remission, which could mean that theory of mind is not state dependent and is a trait marker of schizophrenia.

First degree relatives of patients with schizophrenia also perform poorly on theory of mind tests than healthy controls but better than cases which could mean that theory of mind is an endophenotype of schizophrenia.

First order theory of mind deficit is more in patients with longer duration of untreated psychosis. Second order theory of mind deficits have a positive relation with total PANSS scores and negative symptoms, more the severity, more is the deficit; are more in patients with longer duration of illness, younger age of onset of schizophrenia and longer duration of untreated psychosis. Faux Pas deficits are more in patients with longer duration of illness.

Socio-demographic profile did not have a significant association with theory of mind deficits in any order except employment status.

SUMMARY

Theory of mind is the ability of a person to understand his own and others mental states. Patients with schizophrenia are found to have deficits in social interactions and functioning. It has been found that these patients perform poorly on theory of mind tasks as compared to normal healthy population.

The present study was a one-year descriptive cross-sectional comparative study which was conducted in the Department of Psychiatry, KLES Dr. Prabhakar Kore Hospital and Medical Research Centre, Belagavi from 1st January 2020 to 31st December 2020. A total of 30 cases with a diagnosis of schizophrenia according to ICD-10 DCR, who were in remission, attending the psychiatry OPD were taken up for the study after due consent. Along with them, 30 of their first degree relatives and 30 healthy controls from hospital staff were also included. For all three groups, theory of mind was assessed using Social Cognition Rating Tools in Indian Setting (SOCRATIS). Cases were also assessed for severity of the psychotic symptoms using Positive and Negative Syndrome Scale (PANSS). Appropriate statistical tests were applied. Unpaired t test and One- way ANOVA were used to compare the mean results of all three groups.

43.33% of cases had first order ToM, 77.33% in second order ToM and 93.33% in Faux Pas. First degree relatives were also found to perform poorly on all three domains as compared to controls but better than cases. First order ToM deficit is more in patients with longer duration of untreated psychosis. Second order ToM deficits have a positive relation with PANSS scores and negative symptoms, more the severity, more is the deficit. are more in patients with longer duration of illness, younger age of onset of schizophrenia and longer duration of untreated psychosis. Faux Pas deficits are more in patients with longer duration of illness.

To conclude, the study shows that patients with schizophrenia in remission and their first-degree relatives have ToM deficits. ToM can be a possible endophenotype for schizophrenia. Thus, it is empirical to assess ToM in patients with schizophrenia and any attempts made to address ToM in such patients can lead to a better social and functional outcome.

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ANNEXURE I. ETHICAL CLEARANCE.

	K.J.S.O. ACADEMY OF HIGHER EDUCATION AND RESEARCH (Deemed to be University)	
	Accredited 'A' Grade by NAAC (2013-14/15) JAWAHARLAL NEHRU MEDICAL COLLEGE, NEHRU NAGAR, BELAGAVI-590010 (KARNATAKA-INDIA)	Placed in category 'A' by MHRD (Govt)
Website: http://www.jnmc.edu E-Mail : jnmc@jnmc.edu	Phone (+91-0831) Office : 2472550 Principal: 2471701 Fax No. +91 0831 - 2470759	
Ref: MDC/DOME/ 296		Date: 24/12/2019
To: REG NO. BQ0119003 PG student in Psychiatry, J. N. Medical College, BELAGAVI.		
Sub: Institutional Ethical Clearance for the study.		
<p>With reference to the above, we wish to inform you that your proposed research project titled "THEORY OF MIND DEFICITS IN PATIENTS OF SCHIZOPHRENIA ATTENDING TERTIARY CARE PSYCHIATRIC UNIT- A COMPARATIVE STUDY ", is ethical and justifiable. The proposed research project has been cleared by the JNMC Institutional Ethics Committee on Human Subjects Research.</p>		
 (Dr. Anita Dalal) Member Secretary JNMC Institutional Ethics Committee on Human Subjects Research, J.N.Medical College, Belagavi.		 (Dr. Roshni M Bellad) Chairman, JNMC Institutional Ethics Committee on Human Subjects Research, J.N.Medical College, Belagavi.

ANNEXURE II

INFORMED CONSENT

CONSENT FOR PARTICIPATION IN RESEARCH STUDY

Title: ‘THEORY OF MIND’ DEFICITS IN PATIENTS OF SCHIZOPHRENIA ATTENDING TERTIARY CARE PSYCHIATRIC UNIT - A COMPARATIVE STUDY

Principal Investigator (PI): REG NO. BQ0119003

Objective/Purpose of the study:

You/your relative are/is being requested to be a subject in a comparative study, the purpose of which is to assess capacity to consent for treatment in patients suffering from functional psychosis requiring hospitalization in a tertiary care psychiatric unit between 1stJanuary 2020 and 31stDecember 2021, by Dr. Prabhani Bindra, a post graduate student in the Department of Psychiatry at Jawaharlal Nehru Medical College, KLE University, Belgaum, Karnataka.

You/your relative have/has been requested to participate in this study as you/your relative are/is likely to have a psychiatric illness. This study will help understand the association of uric acid levels in psychiatric disorder which will help us understand its role better and aid in further research. `

Procedure involved: If you/your relative agree to be a part of the study, the PI will interview you/your relative and take the blood sample.

Risks and benefits involved: There are no risks involved. During the period of study, the existence or development of any significant findings in terms of psychiatric disorders will be informed by the PI to you/your relative as well as the parent consultant for the appropriate action

Alternatives: Your/your relative’s participation in this study is a completely voluntary decision. If you/your relative do/does not want to be a part of the study, you/your relative may refuse for the same or if you/your relative are/is already a part of the study and if you/your relative want/wants to withdraw from the study for any

reason, you/your relative may do so without any hesitation. Discontinuation from the study for any reason will not affect your/your relative's current or future relationship with KLES Dr. Prabhakar Kore Hospital, Belgaum.

Privacy and confidentiality: The information provided by you/your relative will be known to the PI and the members of the research team. This information will remain confidential and will be disclosed to others only with your/your relative's written permission or if required by the law.

Financial incentives for participation: You/your relative will not be paid/offered any gifts for participation in the research. There will not be any remuneration for participating in the research and you/your relative will not be reimbursed for any expenses, such as bus/train travelling /companion/assistant etc.

Authorization to publish results: When the results of the research are to be published or discussed in conferences by the PI, no information will be disclosed that will reveal your/your relative's identity.

If you/your relative have/has any questions about this study, you/your relative may contact:

REG NO. BQ0119003
Department of Psychiatry,
Jawaharlal Nehru Medical College,
KAHER, Belagavi-590010
Karnataka.
Phone number- 9897534049

Dr. _____
Professor and Head
Department of Psychiatry,
Jawaharlal Nehru Medical College,
KAHER, Belagavi-590010
Karnataka.

STATEMENT OF CONSENT

I have read and have completely understood the entire information given in the consent form, which explains all the details of the study, i.e., the purpose, procedure involved, risks & benefits, privacy & confidentiality, incentives and the authorization to publish the results of the study. I have voluntarily agreed to participate in the study. I may withdraw my participation for any reason or may be withdrawn by the investigator from the study for any reason at any time. I am not giving up any of my legal rights by signing this consent form. I will be given a copy of this consent form.

Signature of the participant with date: _____

Name of the participant: _____

Signature of the authorized representative with date: _____

Name of the authorized representative: _____

Signature of the witness with date: _____

Name of the witness: _____

Signature of the Investigator with date: _____

ANNEXURE III
PROFORMA

**‘THEORY OF MIND’ DEFICITS IN PATIENTS OF
SCHIZOPHRENIA ATTENDING TERTIARY CARE
PSYCHIATRIC UNIT - A COMPARATIVE STUDY**

Date and Time: **IP/OP No:** **Serial No:**

Name: **Age:** **Sex: M/F**

Marital Status: **Occupation:**

Place: **Informant:**

Phone No: **Socio-economic status:**

Education:

Diagnosis:

Duration of illness:

Past treatment history:

Present treatment history:

Family history of psychiatric illness:

Family history of schizophrenia:

Substance use:

Alcohol Nicotine Cannabis Any other drugs

General Physical Examination:

BP: PULSE: RR: TEMPERATURE:

Height: Weight: BMI:

Systemic Examination:

CNS:

CVS:

RS:

P/A:

Mental Status Examination:

Consciousness

Orientation

Speech

Thought

Mood

Affect

Perception

Insight

Diagnosis

Type of Schizophrenia:

Total duration of illness:

Duration of untreated psychosis:

Age of onset:

No. of hospitalizations:

History of receiving ECTs:

Compliance to treatment:

PANSS Total Score:

Positive score:

Negative score:

MMSE score:

SOCRATIS:

FOT:

SOT:

FPCI:

ANNEXURE IV

TOOLS

SOCRATIS (Social Cognition Rating Tools in Indian Setting) The SOCRATIS (Social Cognition Rating Tools in Indian Setting) is a copyrighted tool for which permission to use freely was granted on the condition that it will not be used for any other purposes except this study, and that it is not to be freely disseminated. To honour this condition, the scale is not attached published with this dissertation.

MINI: Mini International Neuropsychiatric Inter

Patient Name:	_____	Patient Number:	_____
Date of Birth:	_____	Sex (Male / Female):	_____
Interviewer's Name:	_____	Year Interview Took:	_____
Date of Interview:	_____	Total Time:	_____

MODULES	TIME FRAME	MEETS CRITERIA	DSM IV	ICD 10	
A. MAJOR DEPRESSIVE EPISODE	Unif. (1 week)	<input type="checkbox"/>	296.2x-296.2x Single	F32x	<input type="checkbox"/>
	Recurr.	<input type="checkbox"/>	296.2x-296.2x Recurr.	F33x	<input type="checkbox"/>
MDD WITH MELANCHOLIC FEATURES (Specify)	Current (1 week)	<input type="checkbox"/>	296.2x-296.2x Single	F32x	<input type="checkbox"/>
			296.2x-296.2x Recurr.	F33x	<input type="checkbox"/>
B. DYSRHYTHMIA	Unif. (In 1 year)	<input type="checkbox"/>	300.4	F44.1	<input type="checkbox"/>
C. SUICIDALITY	Current (Past Month) Base L, Low L, Moderate L, High	<input type="checkbox"/>			<input type="checkbox"/>
D. MANIC EPISODE	Current	<input type="checkbox"/>	296.2x-296.2x	F40.1x-40.1x	<input type="checkbox"/>
	Past	<input type="checkbox"/>			
HYPOMANIC EPISODE	Current	<input type="checkbox"/>	296.2x-296.2x	F40.2x-40.2x	<input type="checkbox"/>
	Past	<input type="checkbox"/>			
E. PANIC DISORDER	Unif. (Past Month)	<input type="checkbox"/>	300.01-300.01	F41.01-04.01	<input type="checkbox"/>
	Recurr.	<input type="checkbox"/>			
F. AGORAPHOBIA	Current	<input type="checkbox"/>	300.3x	F40.30	<input type="checkbox"/>
G. SOCIAL PHOBIA (Social Anxiety Disorder)	Unif. (Past Month)	<input type="checkbox"/>	300.2	F40.1	<input type="checkbox"/>
H. OBSSESSIVE-COMPULSIVE DISORDER	Current (Past Month)	<input type="checkbox"/>	300.3	F41.1	<input type="checkbox"/>
I. POSTTRAUMATIC STRESS DISORDER	Current (Past Month)	<input type="checkbox"/>	41.01	F41.1	<input type="checkbox"/>
J. ACCIDENT/INTOXICATION/ALCOHOL ABUSE	Past 12 Months	<input type="checkbox"/>	41.0	F41.2x	<input type="checkbox"/>
	Past 12 Months	<input type="checkbox"/>	303.90	F10.1	<input type="checkbox"/>
K. SUBSTANCE DEPENDENCE (Non alcohol) SUBSTANCE ABUSE (Non alcohol)	Past 12 Months	<input type="checkbox"/>	304.00-304.90-304.10	F11.10-F11.1	<input type="checkbox"/>
	Past 12 Months	<input type="checkbox"/>	304.00-304.90-304.10	F11.10-F11.1	<input type="checkbox"/>
L. PSYCHOTIC DISORDERS	Unif.	<input type="checkbox"/>	295.10-295.10-295.11	F20-F29	<input type="checkbox"/>
	Recurr.	<input type="checkbox"/>	295.10-295.10-295.11 295.20-295.20-295.21		
MDD/EPISODE WITH PSYCHOTIC FEATURES (Specify)	Unif.	<input type="checkbox"/>	296.2x-296.2x-296.2x	F32.1x-32.1x	<input type="checkbox"/>
	Recurr.	<input type="checkbox"/>	296.2x-296.2x-296.2x	F33.1x-33.1x F33.2x-33.2x	<input type="checkbox"/>
M. ANOREXIA NERVOSA	Current (Past 12 Months)	<input type="checkbox"/>	307.1	F63.0	<input type="checkbox"/>
N. BULIMIA NERVOSA	Current (Past 12 Months)	<input type="checkbox"/>	307.01	F63.0	<input type="checkbox"/>
	ANOREXIA NERVOSA, BULIMIA, AND BINGE EATING TYPE	Unif.	307.1	F63.0	<input type="checkbox"/>

1	சென்னை மாநகராட்சி	சென்னை (காவிரிமேல்)	1	1965	1965	1
2	சென்னை மாநகராட்சி (காவிரிமேல்)	சென்னை	1	1965	1965	1

மேல்க்கண்ட தகவல்களை மேல்க்கண்ட அட்டைகளில் அளிப்பதற்கான விவரங்களை கீழ்க்கண்டவாறு அளிப்பதற்கான விவரங்களை...

GENERAL INSTRUCTIONS

The MINI was designed as a brief structured interview for the major Axis I psychiatric disorders in DSM-IV and ICD-10. Validation and reliability studies have been done comparing the MINI to the SCID-P for DSM-III-R and the CID1 (a structured interview developed by the World Health Organisation for lay interviewers for ICD-10). The results of these studies show that the MINI has acceptably high validity and reliability scores, but can be administered in a much shorter period of time (mean 8.7 ± 11.6 minutes, median 15 minutes) than the above referenced instruments. It can be used by clinicians, after a brief training session. Lay interviewers require more extensive training.

INTERVIEW:

In order to keep the interview as brief as possible, inform the patient that you will conduct a clinical interview that is more structured than usual, with very precise questions about psychological problems which require a yes or no answer.

GENERAL FORMAT:

The MINI is divided into modules identified by letters, each corresponding to a diagnostic category.

At the beginning of each diagnostic module (except for psychotic disorders module), screening question(s) corresponding to the main criteria of the disorder are presented in a gray box.

At the end of each module, diagnostic box(es) permit the clinician to indicate whether diagnostic criteria are met.

CONVENTIONS:

Sentences written in a normal font should be read exactly as written to the patient in order to standardize the assessment of diagnostic criteria.

Sentences written in a CAPITALS should not be read to the patient. They are instructions for the interviewer to assist in the scoring of the diagnostic algorithms.

Sentences written in a bold indicate the time frame being investigated. The interviewer should read them as often as necessary. Only symptoms occurring during the time frame indicated should be considered in scoring the responses.

Answers with an arrow above them (➔) indicate that one of the criteria necessary for the diagnosis(es) is not met. In this case, the interviewer should go to the end of the module, circle «NO» in all the diagnostic boxes and move to the next module.

When letters are separated by a slash (/) the interviewer should read only those symptoms known to be present in the patient (for example, question 116).

Examples in parentheses are clinical examples of the symptoms. These may be read to the patient to clarify the question.

RATING INSTRUCTIONS:

All questions must be rated. The rating is done at the right of each question by circling either Yes or No. Clinical judgment by the rater should be used in coding the responses. The rater should ask for examples when necessary, to ensure accurate coding. The patient should be encouraged to ask for clarification on any question that is not absolutely clear.

The clinician should be sure that each dimension of the question is taken into account by the patient (for example, time frame, frequency, severity, and/or alternatives).

Symptoms better accounted for by an organic cause or by the use of alcohol or drugs should not be coded positive in the MINI. The MINI Plus has questions that investigate these issues.

For any questions, suggestions, need for a training session, or information about updates of the MINI, please contact :

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A. MAJOR DEPRESSIVE EPISODE

(➔ MEANS: GO TO THE DIAGNOSTIC BOXES, CIRCLE NO IN ALL DIAGNOSTIC BOXES, AND MOVE TO THE NEXT MODULE)

A1	Have you been consistently depressed or down, most of the day, nearly every day, for the past two weeks?	NO	YES
A2	In the past two weeks, have you been much less interested in most things or much less able to enjoy the things you used to enjoy most of the time?	NO	YES
	IS A1 OR A2 CIRCLED YES?	➔ NO	YES

A3 Over the past two weeks, when you felt depressed or uninterested:

- | | | | |
|---|--|----|-------|
| a | Was your appetite decreased or increased nearly every day? Did your weight decrease or increase without trying intentionally (i.e. by $\pm 5\%$ of body weight or ± 8 lbs. or ± 3.5 kgs., for a 160 lb./70 kg. person in a month)?
0 = YES TO EITHER, CIRCLE YES. | NO | YES * |
| b | Did you have trouble sleeping nearly every night (difficulty falling asleep, waking up in the middle of the night, early morning waking or sleeping excessively)? | NO | YES |
| c | Did you talk or move more slowly than normal or were you fatigued, restless or having trouble sitting still almost every day? | NO | YES * |
| d | Did you feel tired or without energy almost every day? | NO | YES |
| e | Did you feel worthless or guilty almost every day? | NO | YES |
| f | Did you have difficulty concentrating or making decisions almost every day? | NO | YES |
| g | Did you repeatedly consider hurting yourself, feel suicidal, or wish that you were dead? | NO | YES |

ARE 5 OR MORE ANSWERS (A1-A3) CIRCLED YES?

NO	YES *
MAJOR DEPRESSIVE EPISODE, CURRENT	

IF PATIENT HAS CURRENT MAJOR DEPRESSIVE EPISODE CONTINUE TO A4. OTHERWISE MOVE TO MODULE B:

- | | | | |
|----|--|---------|-----|
| A4 | a. During your lifetime, did you have other episodes of two weeks or more when you felt depressed or uninterested in most things, and had most of the problems we just talked about? | ➔
NO | YES |
|----|--|---------|-----|

- | | |
|----|---|
| b. | In between 2 episodes of depression, did you ever have an interval of at least 2 months, without any depression and any loss of interest? |
|----|---|

NO	YES
MAJOR DEPRESSIVE EPISODE, RECURRENT	

* If patient has Major Depressive Episode, Current, use this information in coding the corresponding questions on page 5 (A5d, A6c).

MAJOR DEPRESSIVE EPISODE WITH MELANCHOLIC FEATURES (optional)

(➔ MEANS : GO TO THE DIAGNOSTIC BOX, CIRCLE NO., AND MOVE TO THE NEXT MODULE)

IF THE PATIENT CODES POSITIVE FOR A CURRENT MAJOR DEPRESSIVE EPISODE (A5 = YES), ENCLOSE THE FOLLOWING:

A5	a	During the most severe period of the current depressive episode, did you lose almost completely your ability to enjoy nearly everything?	NO	YES
	b	During the most severe period of the current depressive episode, did you lose your ability to respond to things that previously gave you pleasure or cheered you up? IF NO: When something good happens does it fail to make you feel better, even temporarily?	NO	YES
		IS EITHER A5a OR A5b CODED YES?	➔ NO	YES

A6 Over the past two week period, when you felt depressed and uninterested:

- | | | | |
|---|--|----|-----|
| a | Did you feel depressed in a way that is different from the kind of feeling you experience when someone close to you dies? | NO | YES |
| b | Did you feel regularly worse in the morning, almost every day? | NO | YES |
| c | Did you wake up at least 2 hours before the usual time of awakening and have difficulty getting back to sleep, almost every day? | NO | YES |
| d | IS A3c CODED YES (PSYCHOMOTOR RETARDATION OR AGITATION)? | NO | YES |
| e | IS A3a CODED YES FOR ANOREXIA OR WEIGHT LOSS? | NO | YES |
| f | Did you feel excessive guilt or guilt out of proportion to the reality of the situation? | NO | YES |

ARE 3 OR MORE A6 ANSWERS CODED YES?

NO	YES
<i>Major Depressive Episode with Melancholic Features Current</i>	

B. DYSTHYMIA

(➔ MEANS : GO TO THE DIAGNOSTIC BOX, CIRCLE NO, AND MOVE TO THE NEXT MODULE)

IF PATIENT'S SYMPTOMS CURRENTLY MEET CRITERIA FOR MAJOR DEPRESSIVE EPISODE, DO NOT ENTER THIS MODULE

B1	Have you felt sad, low or depressed most of the time for the last two years?	➔ NO	YES
B2	Was this period interrupted by your feeling OK for two months or more?	NO	➔ YES
B3	During this period of feeling depressed most of the time:		
a	Did your appetite change significantly?	NO	YES
b	Did you have trouble sleeping or sleep excessively?	NO	YES
c	Did you feel tired or without energy?	NO	YES
d	Did you lose your self-confidence?	NO	YES
e	Did you have trouble concentrating or making decisions?	NO	YES
f	Did you feel hopeless?	NO	YES
	ARE 2 OR MORE (B1) ANSWERS CIRCLED YES?	➔ NO	YES
B4	Did the symptoms of depression cause you significant distress or impair your ability to function at work, socially, or in some other important way?	NO	YES

NO YES

DYSTHYMIA

CURRENT

C. SUICIDALITY

In the past month did you:

		NO	YES	Points
C1	Suffer any accident? IF NO TO C1, SKIP TO C2; IF YES, ASK C1a;			0
C1a	Plan or intend to hurt yourself in that accident either passively or actively? IF NO TO C1a, SKIP TO C2; IF YES, ASK C1b;			0
C1b	Did you intend to die as a result of this accident?			0
C2	Think that you would be better off dead or wish you were dead?			1
C3	Want to harm yourself or to hurt or to injure yourself?			2
C4	Think about suicide?			5

IF YES, ASK ABOUT THE INTENSITY AND FREQUENCY OF THE SUICIDAL IDEATION:

Frequency Intensity

Occasionally	<input type="checkbox"/>	Mild	<input type="checkbox"/>
Often	<input type="checkbox"/>	Moderate	<input type="checkbox"/>
Very often	<input type="checkbox"/>	Severe	<input type="checkbox"/>

Can you control these impulses and state that you will not act on them while in this program?

Only score 5 points if response is NO. NO YES 5

C5	Have a suicide plan?			5
C6	Take any active steps to prepare to injure yourself or to prepare for a suicide attempt in which you expect or intend to die?			0
C7	Deliberately injure yourself without intending to kill yourself?			4
C8	Attempt suicide? Hoped to be rescued / survive <input type="checkbox"/> Expected / intended to die <input type="checkbox"/>			10

In your lifetime:

C9	Did you ever make a suicide attempt?			1
----	--------------------------------------	--	--	---

≥ AT LEAST 1 OF THE ABOVE (EXCEPT C1) CHECKED YES?

IF YES, ADD THE TOTAL NUMBER OF POINTS FOR THE ANSWERS (C1-C9) CHECKED "YES" AND SPECIFY THE LEVEL OF SUICIDE RISK AS INDICATED IN THE DIAGNOSTIC BOX:

MAKE ANY ADDITIONAL COMMENTS ABOUT YOUR ASSESSMENT OF THIS PATIENT'S CURRENT AND NEAR FUTURE SUICIDE RISK IN THE SPACE BELOW.

NO	YES
SUICIDE RISK CURRENT	
1-8 points	Low <input type="checkbox"/>
9-16 points	Moderate <input type="checkbox"/>
≥ 17 points	High <input type="checkbox"/>

D. (HYPO) MANIC EPISODE

(➔ MEANS: GO TO THE DIAGNOSTIC BOXES, CIRCLE NO IN ALL DIAGNOSTIC BOXES, AND MOVE TO THE NEXT MODULE)

D1	a	Have you ever had a period of time when you were feeling 'up' or 'high' or 'hyper' (i.e., so full of energy or full of yourself that you got into trouble, or that other people thought you were not your usual self)? (Do not consider times when you were intoxicated on drugs or alcohol.)	NO	YES
<p>IF PATIENT IS HESITANT OR UNCLEAR ABOUT WHAT YOU MEAN BY 'UP' OR 'HIGH' OR 'HYPER', CLARIFY AS FOLLOWS: "By 'up' or 'high' or 'hyper' I mean: having elated mood, increased energy; needing less sleep; having rapid thoughts; being full of ideas; having an increase in productivity, motivation, creativity, or impulsive behavior."</p> <p>IF NO, CODE NO TO D1a. IF YES, ASK:</p>				
	b	Are you currently feeling 'up' or 'high' or 'hyper' or full of energy?	NO	YES
D2	a	Have you ever been persistently irritable, for several days, so that you had arguments or verbal or physical fights, or shouted at people outside your family? Have you or others noticed that you have been more irritable or over-reacted, compared to other people, even in situations that you felt were justified?	NO	YES
<p>IF NO, CODE NO TO D2a. IF YES, ASK:</p>				
	b	Are you currently feeling persistently irritable?	NO	YES
IS D1a OR D2a CODED YES?			NO	YES

D3 IF D1b OR D2b = YES: EMPLOY THE CURRENT AND THE MOST SYMPTOMATIC PAST EPISODE. OTHERWISE IF D1b AND D2b = NO: EMPLOY ONLY THE MOST SYMPTOMATIC PAST EPISODE.

During the times when you felt high, full of energy, or irritable did you:

	Current Episode		Past Episode	
	NO	YES	NO	YES
a. Feel that you could do things others couldn't do, or that you were an especially important person? If YES, ASK FOR EXAMPLES. THE EXAMPLES ARE CONSISTENT WITH A DELUSIONAL IDEA. <input type="checkbox"/> No <input type="checkbox"/> Yes	NO	YES	NO	YES
b. Need less sleep (for example, feel rested after only a few hours sleep)?	NO	YES	NO	YES
c. Talk too much without stopping, or so that that people had difficulty understanding?	NO	YES	NO	YES
d. Have racing thoughts?	NO	YES	NO	YES
e. Become easily distracted so that any little interruption could distract you?	NO	YES	NO	YES
f. Become so active or physically restless that others were worried about you?	NO	YES	NO	YES
g. Want so much to engage in pleasurable activities that you ignored the risks or consequences (for example, speeding, reckless driving, or sexual indiscretions)?	NO	YES	NO	YES

	Current Episode		Past Episode	
	NO	YES	NO	YES
<p>DM (HYPOMANIC): Are there more DM symptoms coded YES (for a 4-week period) than NO (for a 4-week period), and D4 to S4 (for a 4-week period)?</p> <p>DM (MANIC): Are there more DM symptoms coded YES (for a 4-week period) than NO (for a 4-week period), and D4 to S4 (for a 4-week period) with DELIRIUM/ALCOHOL REQUIRES 4 OF THE DM SYMPTOMS.</p> <p>VERIFY IF THE SYMPTOMS OCCURRED DURING THE SAME TIME PERIOD.</p>				
<p>D4 Did these symptoms last at least 4 weeks and cause significant problems at home, at work, socially, or at school, or were you hospitalized for these problems?</p>	NO	YES	NO	YES
	↓	↓	↓	↓
<p>THE EPISODE EXPLORIED WAS A:</p>	<input type="checkbox"/> HYPOMANIC EPISODE	<input type="checkbox"/> MANIC EPISODE	<input type="checkbox"/> HYPOMANIC EPISODE	<input type="checkbox"/> MANIC EPISODE

IS DM CODED NO?

SPECIFY IF THE EPISODE IS CURRENT OR PAST.

NO	YES
HYPOMANIC EPISODE	
CURRENT	<input type="checkbox"/>
PAST	<input type="checkbox"/>

IS DM CODED YES?

SPECIFY IF THE EPISODE IS CURRENT OR PAST.

NO	YES
MANIC EPISODE	
CURRENT	<input type="checkbox"/>
PAST	<input type="checkbox"/>

E. PANIC DISORDER

* MEAS 1: CIRCLE NO IN E5, E6 AND E7 AND SKIP TO F1

E1	a	Have you, on more than one occasion, had spells or attacks when you suddenly felt nervous, frightened, uncomfortable or uneasy, even in situations where most people would not feel that way?	➔ NO	YES
	b	Did the spells surge to a peak within 10 minutes of starting?	➔ NO	YES
E2		At any time in the past, did any of these spells or attacks come on unexpectedly or occur in an unpredictable or unprovoked manner?	➔ NO	YES
E3		Have you ever had one such attack, followed by a month or more of persistent concern about having another attack, or worries about the consequences of the attack, or did you make a significant change in your behavior because of the attacks (e.g., stopping only with a companion, not wanting to leave your house, visiting the emergency room repeatedly, or seeing your doctor more frequently because of the symptoms)?	NO	YES
E4		During the worst spell that you can remember:		
	a	Did you have skipping, racing or pounding of your heart?	NO	YES
	b	Did you have sweating or clammy hands?	NO	YES
	c	Were you trembling or shaking?	NO	YES
	d	Did you have shortness of breath or difficulty breathing?	NO	YES
	e	Did you have a choking sensation, or a lump in your throat?	NO	YES
	f	Did you have chest pain, pressure or discomfort?	NO	YES
	g	Did you have nausea, stomach problems or sudden dizziness?	NO	YES
	h	Did you feel dizzy, unsteady, lightheaded or faint?	NO	YES
	i	Did things around you feel strange, unreal, detached or unfamiliar, or did you feel outside of or detached from part or all of your body?	NO	YES
	j	Did you fear that you were losing control or going crazy?	NO	YES
	k	Did you fear that you were dying?	NO	YES
	l	Did you have tingling or numbness in parts of your body?	NO	YES
	m	Did you have hot flashes or chills?	NO	YES
E5		ARE BOTH E3, AND 4 OR MORE E4 ANSWERS CODED YES? IF YES TO E5, SKIP TO E7	NO	YES PANIC DISORDER CURRENT
E6		IF E5 = NO, ARE ANY E7 ANSWERS CODED YES? THEN SKIP TO F1	NO	YES PANIC DISORDER ALREADY LISTED
E7		In the past month, did you have such attacks repeatedly (2 or more) followed by persistent concern about having another attack?	NO	YES PANIC DISORDER CURRENT

M.I.N.I. 5.0.0 (July 1, 2006)

11

F. AGORAPHOBIA

F1	Do you feel anxious or uneasy in places or situations where you might have a panic attack or the panic-like symptoms we just spoke about, or where help might not be available or escape might be difficult? (like being in a crowd, standing in a line (queue), when you are alone away from home or alone at home, or when crossing a bridge, traveling in a bus, train or car?)	NO	YES
IF F1 – NO, CIRCLE NO IN F2.			
F2	Do you fear these situations so much that you avoid them, or suffer through them, or need a companion to face them?	NO	YES <small>AGORAPHOBIA CURRENT</small>

IS F2 (CURRENT AGORAPHOBIA) CODED NO

and

IS E7 (CURRENT PANIC DISORDER) CODED YES?

NO YES

*PANIC DISORDER
without Agoraphobia
CURRENT*

IS F2 (CURRENT AGORAPHOBIA) CODED YES

and

IS E7 (CURRENT PANIC DISORDER) CODED YES?

NO YES

*PANIC DISORDER
with Agoraphobia
CURRENT*

IS F2 (CURRENT AGORAPHOBIA) CODED YES

and

IS E5 (PANIC DISORDER LIFETIME) CODED NO?

NO YES

*AGORAPHOBIA, CURRENT
without history of
Panic Disorder*

G. SOCIAL PHOBIA (Social Anxiety Disorder)

(◆ MEANS : GO TO THE DIAGNOSTIC BOX, CIRCLE NO AND MOVE TO THE NEXT MODULE)

G1	In the past month, were you fearful or embarrassed being watched, being the focus of attention, or fearful of being humiliated? This includes things like speaking in public, eating in public or with others, waiting while someone watches or being in social situations.	→ NO	YES
----	---	---------	-----

G2	Is this social fear excessive or unreasonable?	→ NO	YES
----	--	---------	-----

G3	Do you fear these social situations so much that you avoid them or suffer through them?	→ NO	YES
----	---	---------	-----

G4	Do these social fears disrupt your normal work or social functioning or cause you significant distress?	NO	YES
----	---	----	-----

SUBTYPES

Do you fear and avoid 4 or more social situations?

IF YES Generalized social phobia (social anxiety disorder)

IF NO Non-generalized social phobia (social anxiety disorder)

NOTE TO INTERVIEWER: PLEASE ASSESS WHETHER THE SUBJECT'S FEARS ARE RESTRICTED TO NON-GENERALIZED ("ONLY 1 OR SEVERAL") SOCIAL SITUATIONS OR EXTEND TO GENERALIZED ("MOST") SOCIAL SITUATIONS. "MOST" SOCIAL SITUATIONS IS USUALLY OPERATIONALIZED TO MEAN 4 OR MORE SOCIAL SITUATIONS, ALTHOUGH THE DSM-IV DOES NOT EXPLICITLY STATE THIS.

EXAMPLES OF SUCH SOCIAL SITUATIONS TYPICALLY INCLUDE: INITIATING OR MAINTAINING A CONVERSATION, PARTICIPATING IN SMALL GROUPS, DATING, SPEAKING TO AUTHORITY FIGURES, ATTENDING PARTIES, PUBLIC SPEAKING, EATING IN FRONT OF OTHERS, URINATING IN A PUBLIC WASHROOM, ETC.

NO	YES
SOCIAL PHOBIA <i>(Social Anxiety Disorder)</i>	
CURRENT	
GENERALIZED	<input type="checkbox"/>
NON-GENERALIZED	<input type="checkbox"/>

H. OBSESSIVE-COMPULSIVE DISORDER

(*) MEANS: GO TO THE DIAGNOSTIC BOX, CIRCLE NO AND MOVE TO THE NEXT MODULE

H1	In the past month, have you been bothered by recurrent thoughts, impulses, or images that were unwanted, distressful, inappropriate, intrusive, or distressing? (For example: the idea that you were dirty, contaminated or had germs, or fear of contaminating others, or fear of harming someone even though you didn't want to, or fearing you would act on some impulse, or fear or superstitions that you would be responsible for things going wrong, or obsessions with sexual thoughts, images or impulses, or hoarding, collecting, or religious obsessions.)	NO	YES				
		↓ SKIP TO H1					
	<small>(DO NOT INCLUDE SIMPLY EXCESSIVE WORRIES ABOUT REAL LIFE PROBLEMS. DO NOT INCLUDE OBSESSIONS DIRECTLY RELATED TO HEALTH PROBLEMS (e.g. SEXUAL DYSFUNCTION, PAINFUL ORICIAL GABLING, OR ALCOHOL OR DRUG ABUSE) BECAUSE THE PATIENT MAY DERIVE PLEASURE FROM THE ACTIVITY AND MAY WANT TO RESIST IT ONLY BECAUSE OF THE NEGATIVE CONSEQUENCES.)</small>						
H2	Did they keep coming back into your mind even when you tried to ignore or get rid of them?	NO	YES				
		↓ SKIP TO H1					
H3	Do you think that these obsessions are the product of your own mind and that they are not imposed from the outside?	NO	YES				
			(Continue)				
H4	In the past month, did you do something repeatedly without being able to resist doing it, like washing or cleaning excessively, counting or checking things over and over, or repeating, collecting, arranging things, or other superstitious rituals?	NO	YES				
			(Continue)				
	IS H2 OR H4 CORRECT YES?	NO	YES				
		↓					
H5	Did you recognize that either these obsessive thoughts or these compulsive behaviors were excessive or unreasonable?	NO	YES				
		↓					
H6	Did these obsessive thoughts and/or compulsive behaviors significantly interfere with your normal routine, your work or school, your usual social activities, or relationships, or did they take more than one hour a day?	NO	YES				
		↓					
		<table border="1" style="margin: auto;"> <tbody> <tr> <td style="text-align: center;">NO</td> <td style="text-align: center;">YES</td> </tr> <tr> <td colspan="2" style="text-align: center;">O.C.D. CURRENT</td> </tr> </tbody> </table>		NO	YES	O.C.D. CURRENT	
NO	YES						
O.C.D. CURRENT							

I. POSTTRAUMATIC STRESS DISORDER (optional)

(➔ MEANS : GO TO THE DIAGNOSTIC BOX, CIRCLE NO, AND MOVE TO THE NEXT MODULE)

11	Have you ever experienced or witnessed or had to deal with an extremely traumatic event that included actual or threatened death or serious injury to you or someone else? EXAMPLES OF TRAUMATIC EVENTS INCLUDE: SERIOUS ACCIDENTS, SEXUAL OR PHYSICAL ASSAULT, A TERRORIST ATTACK, BEING HELD HOSTAGE, KIDNAPPING, FIRE, DISCOVERING A BODY, WITNESS DEATH OF SOMEONE CLOSE TO YOU, WAR, OR NATURAL DISASTER.	➔ NO	YES
12	Did you respond with intense fear, helplessness or horror?	➔ NO	YES
13	During the past month, have you re-experienced the event in a distressing way (such as, dreams, intense recollections, flashbacks or physical reactions)?	➔ NO	YES
14	In the past month:		
a	Have you avoided thinking about or talking about the event?	NO	YES
b	Have you avoided activities, places or people that remind you of the event?	NO	YES
c	Have you had trouble recalling some important part of what happened?	NO	YES
d	Have you become much less interested in hobbies or social activities?	NO	YES
e	Have you felt detached or estranged from others?	NO	YES
f	Have you noticed that your feelings are numb?	NO	YES
g	Have you felt that your life will be shortened or that you will die sooner than other people?	NO	YES
	ARE 5 OR MORE 14 ANSWERS CIRCLED YES?	➔ NO	YES
15	In the past month:		
a	Have you had difficulty sleeping?	NO	YES
b	Were you especially irritable or did you have outbursts of anger?	NO	YES
c	Have you had difficulty concentrating?	NO	YES
d	Were you nervous or constantly on your guard?	NO	YES
e	Were you easily startled?	NO	YES
	ARE 2 OR MORE 15 ANSWERS CIRCLED YES?	➔ NO	YES
16	During the past month, have these problems significantly interfered with your work or social activities, or caused significant distress?	NO	YES

NO YES

**POSTTRAUMATIC
STRESS DISORDER
CURRENT**

J. ALCOHOL ABUSE AND DEPENDENCE

(➔ MEANS: GO TO DIAGNOSTIC BOXES, CIRCLE NO IN BOTH AND MOVE TO THE NEXT MODULE)

J1	In the past 12 months, have you had 1 or more alcoholic drinks within a 5 hour period on 5 or more occasions?	➔ NO	YES
J2	In the past 12 months:		
a	Did you need to drink more in order to get the same effect that you got when you first started drinking?	NO	YES
b	When you cut down on drinking, did your hands shake, did you sweat or feel agitated? Did you drink to avoid these symptoms or to avoid being hungover, for example, "the shakes", sweating or agitation? 0 = NO, 1 = OTHER, 2 = YES	NO	YES
c	During the times when you drank alcohol, did you end up drinking more than you planned when you started?	NO	YES
d	Have you tried to reduce or stop drinking alcohol but failed?	NO	YES
e	On the days that you drink, did you spend substantial time in obtaining alcohol, drinking, or in recovering from the effects of alcohol?	NO	YES
f	Did you spend less time working, enjoying hobbies, or being with others because of your drinking?	NO	YES
g	Have you continued to drink even though you knew that the drinking caused you health or mental problems?	NO	YES
ARE 3 OR MORE J2 ANSWERS CODED YES?		NO	YES*
* IF YES, SKIP J3 QUESTIONS, CIRCLE N/A IN THE ABUSE BOX AND MOVE TO THE NEXT DISORDER. DEPENDENCE PREEMPTS ABUSE.		ALCOHOL DEPENDENCE CURRENT	
J3	In the past 12 months:		
a	Have you been intoxicated, high, or inebriated more than once when you had other responsibilities at school, at work, or at home? Did this cause any problems? (DO NOT INCLUDE THIS QUESTION FOR J3/J4)	NO	YES
b	Were you intoxicated more than once in any situation where you were physically at risk, for example, driving a car, riding a motorbike, using machinery, hunting, etc.?	NO	YES
c	Did you have legal problems more than once because of your drinking, for example, an arrest or disorderly conduct?	NO	YES
d	Did you continue to drink even though your drinking caused problems with your family or other people?	NO	YES
ARE 1 OR MORE J3 ANSWERS CODED YES?		NO	N/A YES
		ALCOHOL ABUSE CURRENT	

K. NON-ALCOHOL PSYCHOACTIVE SUBSTANCE USE DISORDERS

➔ **INSTRUCTIONS:** GO TO THE DIAGNOSTIC BOXES, CIRCLE NO IN ALL DIAGNOSTIC BOXES, AND MOVE TO THE NEXT MODULE

New Team going to show you / read to you a list of street drugs or medications.						
K1	a	In the past 12 months, did you take any of these drugs more than once, to get high, to feel better, or to change your mood?	<table border="0"> <tr> <td>➔</td> <td>NO</td> <td>YES</td> </tr> </table>	➔	NO	YES
➔	NO	YES				

CIRCLE EACH DRUG TAKEN:

Stimulants: amphetamine, "speed", crystal meth, "crack", "yash", Desoxine, Ritalin, diet pills.

Cocaine: snorting, IV, freebase, crack, "speedball".

Narcotics: heroin, morphine, D, codeine, opium, Demerol, methadone, oxycodone, Percocet, Duramorph, OxyContin.

Hallucinogens: LSD ("acid"), mescaline, peyote, PCP ("angel dust", "peace pill"), psilocybin, STP, "mushrooms", "ecstasy", MDA, MDMA, or ketamine ("special K").

Inhalants: "glue", ethyl chloride, "rush", nitrous oxide ("laughing gas"), amyl or butyl nitrate ("poppers")

Marijuana: hashish ("hash"), THC, "pot", "grass", "weed", "reefer".

Tranquillizers: Quaalude, Nembutal ("reds"), Valium, Xanax, Librium, Ativan, Dalmane, Halcion, barbiturates, Midazol, GHB, Rochnol, "Roche".

Miscellaneous: steroids, non-prescription sleep or diet pills. Any others?

SPECIFY MOST USED DRUG(S): _____

- | | |
|--|--------------------------|
| ONLY ONE DRUG / DRUG CLASS HAS BEEN USED | CHECK ONE BOX |
| | <input type="checkbox"/> |
| ONLY THE MOST USED DRUG CLASS IS INVESTIGATED | <input type="checkbox"/> |
| EACH DRUG CLASS USED IS EXAMINED SEPARATELY (PHOTOCOPY KEYS TO CLASS NUMBER) | <input type="checkbox"/> |
- b. SPECIFY WHICH DRUG/DRUG CLASS WILL BE EMPLOYED IN THE INTERVIEW BELOW IF THERE IS CONCURRENT OR SEQUENTIAL POLYSUBSTANCE USE:

K2	Considering your use of (NAME OF DRUG / DRUG CLASS SELECTED) in the past 12 months:			
	a	Have you found that you needed to use more (NAME OF DRUG / DRUG CLASS SELECTED) to get the same effect that you did when you first started taking it?	NO	YES
	b	When you reduced or stopped using (NAME OF DRUG / DRUG CLASS SELECTED), did you have withdrawal symptoms (aches, shakiness, fever, weakness, diarrhea, nausea, sweating, heart pounding, difficulty sleeping, or feeling agitated, anxious, irritable, or depressed)? Did you use any drug(s) to keep yourself from getting sick (withdrawal symptoms) or so that you would feel better?	NO	YES
		IF YES TO EITHER, CODE YES.		
	c	Have you often found that when you used (NAME OF DRUG / DRUG CLASS SELECTED), you ended up taking more than you thought you would?	NO	YES
	d	Have you tried to reduce or stop taking (NAME OF DRUG / DRUG CLASS SELECTED) but failed?	NO	YES
	e	On the days that you used (NAME OF DRUG / DRUG CLASS SELECTED), did you spend substantial time (> 2 hours), obtaining, using or in recovering from the drug, or thinking about the drug?	NO	YES

- f Did you spend less time working, enjoying hobbies, or being with family or friends because of your drug use? NO YES
- g Have you continued to use (name of drug / drug class selected), even though it caused you health or mental problems? NO YES

ASK 3 OR MORE K2 ANSWERS CODED YES?

SPECIFY DRUG(S): _____

* IF YES, SKIP K3 QUESTIONS, CIRCLE N/A IN THE ABUSE BOX FOR THIS SUBSTANCE AND MOVE TO THE NEXT DISORDER.
DEPENDENCE PROBLEMS 4 B USE

NO	YES *
SUBSTANCE DEPENDENCE CURRENT	

Considering your use of (NAME THE DRUG CLASS SELECTED), in the past 12 months:

- K3 a Have you been intoxicated, high, or hungover from (NAME OF DRUG / DRUG CLASS SELECTED) more than once, when you had other responsibilities at school, at work, or at home? Did this cause any problems? NO YES
(CODE YES ONLY IF THIS CAUSED PROBLEMS.)
- b Have you been high or intoxicated from (name of drug / drug class selected) more than once in any situation where you were physically at risk (for example, driving a car, riding a motorcycle, using machinery, boating, etc)? NO YES
- c Did you have legal problems more than once because of your drug use, for example, an arrest or disorderly conduct? NO YES
- d Did you continue to use (name of drug / drug class selected), even though it caused problems with your family or other people? NO YES

ARE 1 OR MORE K3 ANSWERS CODED YES?

SPECIFY DRUG(S): _____

NO	N/A	YES
SUBSTANCE ABUSE CURRENT		

L. PSYCHOTIC DISORDERS AND MOOD DISORDER WITH PSYCHOTIC FEATURES

ASK FOR AN EXAMPLE OF EACH QUESTION ANSWERED POSITIVELY. CODE YES ONLY IF THE EXAMPLES CLEARLY SHOW A DISTORTION OF THOUGHT OR OF PERCEPTION OR IF THEY ARE NOT CULTURALLY APPROPRIATE. BEFORE CODING, INVESTIGATE WHETHER BELIEFS QUALIFY AS "BIZARRE".

INCLUDES ALL "BIZARRE" BELIEFS, INCLUDING DELUSIONS, AND IDEAS NOT BELIEVED IN BY THE INDIVIDUAL HIMSELF, INCLUDING BELIEFS BASED ON CULTURAL BELIEFS.

HALLUCINATIONS ARE SCORED "BIZARRE" IF A VOICE COMMENTS ON THE PERSON'S THOUGHTS OR BEHAVIOR, OR WHEN TWO OR MORE VOICES ARE CONVERSING WITH EACH OTHER.

				BIZARRE
Now I am going to ask you about unusual experiences that some people have.				
L1	a	Have you ever believed that people were spying on you, or that someone was plotting against you, or trying to hurt you? <small>NOTE: USE FOR EXAMPLES TO DETERMINE ACTUAL STRANGERS.</small>	NO YES	YES
	b	IF YES OR YES BIZARRE: do you currently believe these things?	NO YES	YES #1.6
L2	a	Have you ever believed that someone was reading your mind or could hear your thoughts, or that you could actually read someone's mind or hear what another person was thinking?	NO YES	YES
	b	IF YES OR YES BIZARRE: do you currently believe these things?	NO YES	YES #1.6
L3	a	Have you ever believed that someone or some force outside of yourself put thoughts in your mind that were not your own, or made you act in a way that was not your usual self? Have you ever felt that you were possessed? <small>(CLINICIAN: ASK FOR EXAMPLES AND RECORD ANY THAT ARE NOT PSYCHOTIC.)</small>	NO YES	YES
	b	IF YES OR YES BIZARRE: do you currently believe these things?	NO YES	YES #1.6
L4	a	Have you ever believed that you were being sent special messages through the TV, radio, or newspaper, or that a person you did not personally know was particularly interested in you?	NO YES	YES
	b	IF YES OR YES BIZARRE: do you currently believe these things?	NO YES	YES #1.6
L5	a	Have your relatives or friends ever considered any of your beliefs strange or unusual? <small>(REVERSE: USE FOR EXAMPLES. ONLY CODE YES IF THE EXAMPLES ARE CLEARLY DELUSIONAL. IDEAS NOT EXPLORED BY QUESTIONS L1 TO L4, FOR EXAMPLE, SOMATIC DELUSIONS OR BELIEFS THAT BELIEFS ARE CAUSED BY GODS OR SPIRITS, ARE NOT "BIZARRE".)</small>	NO YES	YES
	b	IF YES OR YES BIZARRE: do they currently consider your beliefs strange?	NO YES	YES
L6	a	Have you ever heard things other people couldn't hear, such as voices? <small>HALLUCINATIONS ARE SCORED "BIZARRE" ONLY IF PATIENT ANSWERS YES TO THE FOLLOWING:</small>	NO YES	
		IF YES: Did you hear a voice commenting on your thoughts or behavior or did you hear two or more voices talking to each other?	NO	YES
	b	IF YES OR YES BIZARRE TO 1.6a: have you heard these things in the past month? <small>HALLUCINATIONS ARE SCORED "BIZARRE" ONLY IF PATIENT ANSWERS YES TO BOTH QUESTIONS.</small>	NO YES	YES #1.6
		Did you hear a voice commenting on your thoughts or behavior or did you hear two or more voices talking to each other?		

L7 a Have you ever had visions when you were awake or have you ever seen things other people couldn't see?
(Circled a): CHECK TO SEE IF THESE ARE CULTURALLY APPROPRIATE.

NO YES

b **IF YES:** Have you seen these things in the past month?

NO YES

CLINICIAN'S JUDGMENT

L8 b IS THE PATIENT CURRENTLY EXHIBITING INCOHERENT, DISORGANIZED SPEECH, OR MARKED LOSENING OF ASSOCIATIONS?

NO YES

L9 b IS THE PATIENT CURRENTLY EXHIBITING DISORGANIZED OR CATATONIC BEHAVIOR?

NO YES

L10 b ARE NEGATIVE SYMPTOMS OF SCHIZOPHRENIA, I.E., SIGNIFICANT AFFECTIVE FLATTENING, POVERTY OF SPEECH (ANOSIA) OR AN INABILITY TO INITIATE OR PERSIST IN USUAL EXPECTED ACTIVITIES (AVOLITION), PROMINENT DURING THE INTERVIEW?

NO YES

L11 a ARE 1 OR MORE *a* & *b* QUESTIONS FROM L1a TO L10a CODED YES OR YES BIZARRE AND IS EITHER:

MAJOR DEPRESSIVE EPISODE, (CURRENT OR RECURRENT)

OR

MANIC OR HYPMANIC EPISODE, (CURRENT OR PAST) CODED YES?

NO

YES

~~YES~~

IF NO TO L11 a, CIRCLE NO IN BOTH 'MOOD DISORDER WITH PSYCHOTIC FEATURES' DIAGNOSTIC BOXES AND MOVE TO L13.

b You told me earlier that you had period(s) when you felt (depressed/high/persistently irritable).

NO

YES

Were the beliefs and experiences you just described (paranoia/convictions from L12a to L12c) restricted exclusively to times when you were feeling depressed/high/irritable?

*MOOD DISORDER WITH
 PSYCHOTIC FEATURES*

IF THE PATIENT EVER HAD A PERIOD OF AT LEAST 2 WEEKS OF HAVING THESE BELIEFS OR EXPERIENCES (PSYCHOTIC SYMPTOMS) WHEN THEY WERE NOT DEPRESSED/HIGH/IRRITABLE, CODE NO TO THIS DISORDER.

LIFETIME

IF THE ANSWER IS NO TO THIS DISORDER, ALSO CIRCLE NO TO L12 AND MOVE TO L13

L12 a ARE 1 OR MORE *a* & *b* QUESTIONS FROM L11b TO L17b CODED YES OR YES BIZARRE AND IS EITHER:

NO

YES

MAJOR DEPRESSIVE EPISODE, (CURRENT)

OR

MANIC OR HYPMANIC EPISODE, (CURRENT) CODED YES?

*MOOD DISORDER WITH
 PSYCHOTIC FEATURES*

IF THE ANSWER IS YES TO THIS DISORDER (LIFETIME OR CURRENT), CIRCLE NO TO L13 AND L14 AND MOVE TO THE NEXT MODULE.

CURRENT

L13 ARE 1 OR MORE «b» QUESTIONS FROM L1b TO L1b, CODED YES BIZARRE?
 OR
 ARE 2 OR MORE «b» QUESTIONS FROM L1b TO L1b, CODED YES (RATHER
 THAN YES BIZARRE)?
 AND DID AT LEAST TWO OF THE PSYCHOTIC SYMPTOMS OCCUR DURING THE
 SAME 1 MONTH PERIOD?

NO	YES
<i>PSYCHOTIC DISORDER CURRENT</i>	

L14 IS L13 CODED YES
 OR
 ARE 1 OR MORE «a» QUESTIONS FROM L1a TO L1a, CODED YES BIZARRE?
 OR
 ARE 2 OR MORE «a» QUESTIONS FROM L1a TO L1a, CODED YES (RATHER THAN
 YES BIZARRE)
 AND DID AT LEAST TWO OF THE PSYCHOTIC SYMPTOMS OCCUR DURING THE
 SAME 1 MONTH PERIOD?

NO	YES
<i>PSYCHOTIC DISORDER LIFETIME</i>	

N. BULIMIA NERVOSA

➔ **INSTRUCTIONS :** GO TO THE DIAGNOSTIC BOXES, CIRCLE NO IN ALL DIAGNOSTIC BOXES, AND MOVE TO THE NEXT MODULE

N1	In the past three months, did you have eating binges or fits when you ate a very large amount of food within a 2-hour period?	➔ NO	YES				
N2	In the last 3 months, did you have eating binges as often as twice a week?	➔ NO	YES				
N3	During these binges, did you feel that your eating was out of control?	➔ NO	YES				
N4	Did you do anything to compensate for, or to prevent a weight gain from these binges, like vomiting, fasting, exercising or taking laxatives, enemas, diuretics (fluid pills), or other medications?	➔ NO	YES				
N5	Does your body weight or shape greatly influence how you feel about yourself?	➔ NO	YES				
N6	DO THE PATIENT'S SYMPTOMS MEET CRITERIA FOR ANOREXIA NERVOSA?	NO	YES				
		↓ Skip to N8					
N7	Do these binges occur only when you are under (_____ lbs./kgs)? <small>ENTER YOUR WEIGHT IN THE ABOVE SPACE IN ORDER TO DETERMINE IF YOU QUALIFY FOR THIS SYMPTOM'S WEIGHT FROM THE WEIGHT WEIGHT TABLE IN THE ANOREXIA NERVOSA MODULE.</small>	NO	YES				
N8	IS N5 CODED YES AND IS EITHER N6 OR N7 CODED NO?	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; text-align: center;">NO</td> <td style="width: 50%; text-align: center;">YES</td> </tr> <tr> <td colspan="2" style="text-align: center;">BULIMIA NERVOSA CURRENT</td> </tr> </table>		NO	YES	BULIMIA NERVOSA CURRENT	
NO	YES						
BULIMIA NERVOSA CURRENT							
	IS N7 CODED YES?	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; text-align: center;">NO</td> <td style="width: 50%; text-align: center;">YES</td> </tr> <tr> <td colspan="2" style="text-align: center;">ANOREXIA NERVOSA Binge Eating/Purging Type CURRENT</td> </tr> </table>		NO	YES	ANOREXIA NERVOSA Binge Eating/Purging Type CURRENT	
NO	YES						
ANOREXIA NERVOSA Binge Eating/Purging Type CURRENT							

O. GENERALIZED ANXIETY DISORDER

(➤ MEANS : GO TO THE DIAGNOSTIC BOX, CIRCLE NO. AND MOVE TO THE NEXT MODULE)

O1	a	Have you worried excessively or been anxious about several things over the past 6 months?	➤ NO	YES
	b	Are these worries present most days?	➤ NO	YES
		IS THE PATIENT'S ANXIETY RESTRICTED EXCLUSIVELY TO, OR BETTER EXPLAINED BY, ANY DISORDER PRIOR TO THIS POINT?	NO	➤ YES
O2		Do you find it difficult to control the worries or do they interfere with your ability to focus on what you are doing?	➤ NO	YES
O3		FOR THE FOLLOWING, CODE NO IF THE SYMPTOMS ARE CONFINED TO FEATURES OF ANY DISORDER EXH OR TD PRIOR TO THIS POINT. When you were anxious over the past 6 months, did you, most of the time:		
	a	Feel restless, keyed up or on edge?	NO	YES
	b	Feel tense?	NO	YES
	c	Feel tired, weak or exhausted easily?	NO	YES
	d	Have difficulty concentrating or find your mind going blank?	NO	YES
	e	Feel irritable?	NO	YES
	f	Have difficulty sleeping (difficulty falling asleep, waking up in the middle of the night, early morning awakening or sleeping excessively)?	NO	YES
		ARE 3 OR MORE OF 3 ANSWERS CODED YES?		
			NO	YES
			GENERALIZED ANXIETY DISORDER CURRENT	

P. ANTISOCIAL PERSONALITY DISORDER (optional)

(♦ MEANS I GO TO THE DIAGNOSTIC BOX AND CIRCLE NO.)

- P1 Before you were 15 years old, did you:**
- | | | | |
|---|---|----|-----|
| a | repeatedly skip school or run away from home overnight? | NO | YES |
| b | repeatedly lie, cheat, "con" others, or steal? | NO | YES |
| c | start fights or bully, threaten, or intimidate others? | NO | YES |
| d | deliberately destroy things or start fires? | NO | YES |
| e | deliberately hurt animals or people? | NO | YES |
| f | force someone to have sex with you? | NO | YES |
| | ARE 2 OR MORE P1 ANSWERS CIRCLED YES? | ♦ | NO |
| | | NO | YES |
- DO NOT CODE YES TO THE BEHAVIORS BELOW IF THEY ARE EXCLUSIVELY POLITICALLY OR RELIGIOUSLY MOTIVATED.
- P2 Since you were 15 years old, have you:**
- | | | | |
|---|--|----|-----|
| a | repeatedly behaved in a way that others would consider irresponsible, like failing to pay for things you owed, deliberately being impulsive or deliberately not working to support yourself? | NO | YES |
| b | done things that are illegal even if you didn't get caught (for example, destroying property, shoplifting, stealing, selling drugs, or committing a felony)? | NO | YES |
| c | been in physical fights repeatedly (including physical fights with your spouse or children)? | NO | YES |
| d | often lied or "convinced" other people to get money or pleasure, or lied just for fun? | NO | YES |
| e | exposed others to danger without caring? | NO | YES |
| f | felt no guilt after hurting, mistreating, lying to, or stealing from others, or after damaging property? | NO | YES |

ARE 3 OR MORE P2 QUESTIONS CIRCLED YES?

NO	YES
ANTISOCIAL PERSONALITY DISORDER LIFETIME	


THIS CONCLUDES THE INTERVIEW

MMSE: Mini-Mental State Examination

Mini-Mental State Examination (MMSE)

Patient's Name: _____ Date: _____

Instructions: Answer each question to the best of your ability. Do not guess. Do not use a calculator or watch.

Question Number	Points	Questions
1	1	"What is the year? Season? Date? Day? Month?"
2	1	"Where are we now? State? County? Township? Hospital? Floor?"
3	3	The examiner names three unrelated objects clearly and slowly. Then the examiner asks the patient to name all three of them. The patient's response is good for scoring. The examiner repeats them until patient names all of them, if possible.
4	3	"I would like you to count backwards from 100 by sevens." 100, 93, 86, 79, 72, 65, ... Alternative: "I would like you to count backwards." 100, 99, 98, 97
5	1	"If you had any trouble remembering things, how would you feel, not what you would do?"
6	1	"If you had any trouble remembering things, how would you feel, not what you would do?"
7	1	"Repeat the sentence 'The big red car is in the garage.'"
8	1	"Take the paper in my right hand, hold it in front of you, and put it on the floor. Get the paper in your left hand, and put it on top of the paper on the floor."
9	1	"If you had any trouble remembering things, how would you feel, not what you would do?"
10	1	"Write up what you see in my right hand. Write down what you see in my left hand. Do not use words."
11	1	"Write up what you see in my right hand. Write down what you see in my left hand. Do not use words."
		
12	1	Total.

PANSS: Positive and Negative Syndrome Scale

PANSS RATING SCHEM

		<u>normal</u>	<u>borderline</u>	<u>mod</u>	<u>severe</u>	<u>very severe</u> <u>extreme</u>	<u>total score</u>	<u>subscore</u>
P1	Blindness	1	2	3	4	5	6	7
P2	Conceptual disorganization	1	2	3	4	5	6	7
P3	Hallucinatory ideation	1	2	3	4	5	6	7
P4	Hostility	1	2	3	4	5	6	7
P5	Incoherence	1	2	3	4	5	6	7
P6	Insightness/awareness	1	2	3	4	5	6	7
P7	Intimacy	1	2	3	4	5	6	7
P8	Motor retardation	1	2	3	4	5	6	7
P9	Preoccupation with details	1	2	3	4	5	6	7
P10	Reluctance to accept help	1	2	3	4	5	6	7
P11	Self-censorship	1	2	3	4	5	6	7
P12	Stimulated affect	1	2	3	4	5	6	7
P13	Suspicious/paranoid	1	2	3	4	5	6	7
P14	Tactility	1	2	3	4	5	6	7
P15	Thought disorganization	1	2	3	4	5	6	7
P16	Unusual thoughts/ideas	1	2	3	4	5	6	7
P17	Unusually withdrawn	1	2	3	4	5	6	7
P18	Withdrawal of affect	1	2	3	4	5	6	7
P19	Withdrawal of speech	1	2	3	4	5	6	7
P20	Withdrawal of somatic preoccupation	1	2	3	4	5	6	7
P21	Withdrawal of social contact	1	2	3	4	5	6	7
P22	Withdrawal of sexual interest	1	2	3	4	5	6	7
P23	Withdrawal of verbal interaction	1	2	3	4	5	6	7
P24	Withdrawal of written interaction	1	2	3	4	5	6	7
P25	Withdrawal of visual interaction	1	2	3	4	5	6	7
P26	Withdrawal of tactile interaction	1	2	3	4	5	6	7
P27	Withdrawal of olfactory interaction	1	2	3	4	5	6	7
P28	Withdrawal of gustatory interaction	1	2	3	4	5	6	7
P29	Withdrawal of auditory interaction	1	2	3	4	5	6	7
P30	Withdrawal of visual interaction	1	2	3	4	5	6	7
P31	Withdrawal of tactile interaction	1	2	3	4	5	6	7
P32	Withdrawal of olfactory interaction	1	2	3	4	5	6	7
P33	Withdrawal of gustatory interaction	1	2	3	4	5	6	7
P34	Withdrawal of auditory interaction	1	2	3	4	5	6	7
P35	Withdrawal of visual interaction	1	2	3	4	5	6	7
P36	Withdrawal of tactile interaction	1	2	3	4	5	6	7
P37	Withdrawal of olfactory interaction	1	2	3	4	5	6	7
P38	Withdrawal of gustatory interaction	1	2	3	4	5	6	7
P39	Withdrawal of auditory interaction	1	2	3	4	5	6	7
P40	Withdrawal of visual interaction	1	2	3	4	5	6	7
P41	Withdrawal of tactile interaction	1	2	3	4	5	6	7
P42	Withdrawal of olfactory interaction	1	2	3	4	5	6	7
P43	Withdrawal of gustatory interaction	1	2	3	4	5	6	7
P44	Withdrawal of auditory interaction	1	2	3	4	5	6	7
P45	Withdrawal of visual interaction	1	2	3	4	5	6	7
P46	Withdrawal of tactile interaction	1	2	3	4	5	6	7
P47	Withdrawal of olfactory interaction	1	2	3	4	5	6	7
P48	Withdrawal of gustatory interaction	1	2	3	4	5	6	7
P49	Withdrawal of auditory interaction	1	2	3	4	5	6	7
P50	Withdrawal of visual interaction	1	2	3	4	5	6	7
P51	Withdrawal of tactile interaction	1	2	3	4	5	6	7
P52	Withdrawal of olfactory interaction	1	2	3	4	5	6	7
P53	Withdrawal of gustatory interaction	1	2	3	4	5	6	7
P54	Withdrawal of auditory interaction	1	2	3	4	5	6	7
P55	Withdrawal of visual interaction	1	2	3	4	5	6	7
P56	Withdrawal of tactile interaction	1	2	3	4	5	6	7
P57	Withdrawal of olfactory interaction	1	2	3	4	5	6	7
P58	Withdrawal of gustatory interaction	1	2	3	4	5	6	7
P59	Withdrawal of auditory interaction	1	2	3	4	5	6	7
P60	Withdrawal of visual interaction	1	2	3	4	5	6	7
P61	Withdrawal of tactile interaction	1	2	3	4	5	6	7
P62	Withdrawal of olfactory interaction	1	2	3	4	5	6	7
P63	Withdrawal of gustatory interaction	1	2	3	4	5	6	7
P64	Withdrawal of auditory interaction	1	2	3	4	5	6	7
P65	Withdrawal of visual interaction	1	2	3	4	5	6	7
P66	Withdrawal of tactile interaction	1	2	3	4	5	6	7
P67	Withdrawal of olfactory interaction	1	2	3	4	5	6	7
P68	Withdrawal of gustatory interaction	1	2	3	4	5	6	7
P69	Withdrawal of auditory interaction	1	2	3	4	5	6	7
P70	Withdrawal of visual interaction	1	2	3	4	5	6	7
P71	Withdrawal of tactile interaction	1	2	3	4	5	6	7
P72	Withdrawal of olfactory interaction	1	2	3	4	5	6	7
P73	Withdrawal of gustatory interaction	1	2	3	4	5	6	7
P74	Withdrawal of auditory interaction	1	2	3	4	5	6	7
P75	Withdrawal of visual interaction	1	2	3	4	5	6	7
P76	Withdrawal of tactile interaction	1	2	3	4	5	6	7
P77	Withdrawal of olfactory interaction	1	2	3	4	5	6	7
P78	Withdrawal of gustatory interaction	1	2	3	4	5	6	7
P79	Withdrawal of auditory interaction	1	2	3	4	5	6	7
P80	Withdrawal of visual interaction	1	2	3	4	5	6	7
P81	Withdrawal of tactile interaction	1	2	3	4	5	6	7
P82	Withdrawal of olfactory interaction	1	2	3	4	5	6	7
P83	Withdrawal of gustatory interaction	1	2	3	4	5	6	7
P84	Withdrawal of auditory interaction	1	2	3	4	5	6	7
P85	Withdrawal of visual interaction	1	2	3	4	5	6	7
P86	Withdrawal of tactile interaction	1	2	3	4	5	6	7
P87	Withdrawal of olfactory interaction	1	2	3	4	5	6	7
P88	Withdrawal of gustatory interaction	1	2	3	4	5	6	7
P89	Withdrawal of auditory interaction	1	2	3	4	5	6	7
P90	Withdrawal of visual interaction	1	2	3	4	5	6	7
P91	Withdrawal of tactile interaction	1	2	3	4	5	6	7
P92	Withdrawal of olfactory interaction	1	2	3	4	5	6	7
P93	Withdrawal of gustatory interaction	1	2	3	4	5	6	7
P94	Withdrawal of auditory interaction	1	2	3	4	5	6	7
P95	Withdrawal of visual interaction	1	2	3	4	5	6	7
P96	Withdrawal of tactile interaction	1	2	3	4	5	6	7
P97	Withdrawal of olfactory interaction	1	2	3	4	5	6	7
P98	Withdrawal of gustatory interaction	1	2	3	4	5	6	7
P99	Withdrawal of auditory interaction	1	2	3	4	5	6	7
P100	Withdrawal of visual interaction	1	2	3	4	5	6	7