

Research Paper

A Comparative Study on The Impact of Metacognition on Social Cognition in Patients with Schizophrenia and Depression

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ABSTRACT

Background: Social Cognition has been shown through empirical studies to facilitate community-based rehabilitation for people with mental illnesses and Metacognition has also been proposed to be critical to translating cognitive and functional skills into real-world contexts, but a causal relationship between the two is yet to be explored. **Method:** The study aimed to find out the impact of metacognition on social cognition in patients with schizophrenia and depression. A quantitative research design was adopted. 60 participants chosen through convenient sampling. Tools used were the PANSS, BDI, Metacognition Assessment Scale- Abbreviated Version, and Social Cognition Screening Questionnaire. MAS-A was scored with the help of a blind rater and Inter-rater reliability was calculated. **Results:** The results of the study show that there is a significant impact on the dimensions of metacognition on social cognition and that there is a significant difference between the aspects of metacognition and social cognition between patients with schizophrenia and depression. **Conclusion:** Focusing on enhancing metacognitive abilities as a part of psychosocial intervention will improve social cognition and therefore community-based rehabilitation.

Keywords: *Metacognition; Social Cognition, Schizophrenia, Depression, Social Skills, Metacognitive therapy*

Metacognition as a psychological process represents a spectrum of mental activities that involves thinking about thinking, ranging from more discrete acts in which people recognize specific thoughts and feelings to more synthetic acts in which context of intentions, thoughts feelings, and connections between events, are integrated into larger complex representations (Lysaker et al., 2010; Bröcker et al., 2017; Davies, Fowler, & Greenwood, 2017). People can understand and monitor their cognition with a little regular mental effort. This is the focus of Metacognitive therapy. The term Metacognition describes a range of interrelated factors comprised of any knowledge or cognitive process that is involved in the interpretation, monitoring, or control of cognition. It can be usefully divided into 3 components: knowledge, experiences, and strategies (Wells, 2009; Lysaker et al.,

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2010). Meta-awareness or Metacognitive knowledge refers to the beliefs and theories that people have about their thinking. Metacognitive experiences are the situational appraisals and feelings that individuals have of their mental status. Metacognitive strategies are the responses made to control and alter thinking in the service of emotional and cognitive self-regulation. The strategies selected may intensify, suppress, or change the nature of cognitive activities (Flavell, 1979; Wells, 2009).

Flavell further divided Metacognitive knowledge into 3 types or categories. The first refers to personal variable knowledge. It comprises of the awareness of one's capacities and abilities as well as an awareness of one's process of learning. The second is the knowledge pertaining to the task; an understanding of the various requirements of the task, how to approach and work through the task, and the demands it would place on the individual. The final knowledge is a strategy that denotes the repository of various plausible strategies and the appropriateness of employing them (Livingston, 2003).

These definitions may warrant a question if Cognitive and Metacognitive skills are the same. There is some overlap between the two, however metacognitive skills comprise the evaluation of various cognitive activities that are performed. The process of thinking about a goal, attending to it, perceiving it, and solving problems to reach the goal are all cognitive activities. The processes that typically precede or succeed these processes such as preparing for reaching the goal, basing the strategies to be employed about knowledge and experience, or evaluating the strategies after having achieved the goal are metacognitive. For example, splitting a book into chapters and prioritizing which to read is metacognitive. The process of reading and understanding is cognition. Quizzing oneself in the end to evaluate the effectiveness of reading would also be metacognitive (Livingston, 2003).

It is important to distinguish Metacognition from mentalization. The latter is the understanding and ability to think abstractly, that behavior of people is influenced by the perceptual processes within a person (Luyten et al., 2012). Metacognition is a broader and deeper concept that would incorporate mentalization. It involves not just the ability to think of the abstract concept of cognition but also reflecting upon one's cognitive abilities and governing its influences. Another similar concept that mandates distinction is the theory of mind, which is discussed in the detail later.

Deficits in metacognition are associated with rigid strategies or self-regulation that may lead to many symptoms seen in neurotic disorders. For example, ruminations in depression or worry in anxiety (Ferges and Barden, 2017). A result of poor metacognitive knowledge may also lead to misinterpretation; a student may think they understood a concept and will retain their memory for the exam the next day, but fail to recall it the next day (Flavell, 1979). Understandably, the evaluations of one's thoughts will alter the way in which they perceive not only their cognition but also that of others (Strand et al., 2018). Consequently, it is essential to understand the concept of one's thoughts about others' cognition, or in other words Social Cognition.

Social Cognition

Social cognition refers to the mental activities that allow human beings to understand their thoughts, feelings, and intentions including those of others (Fiske & Taylor, 1991; Ochsner, 2008). Social cognitive capacities can be understood as existing along a spectrum ranging from lower-order to intermediate to higher-order activities (Adolphs, 2010). Lower-order

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forms of social cognitive abilities process discrete social phenomenon (e.g., facial display of basic emotions, biological motion, and speech prosody) and can be characterized as immediate, implicit, and domain-specific. Intermediate social cognitive activities call for judgments to be made about the specific mental state level. These are commonly referred to as the theory of mind and perspective taking (Brune, 2005; Woodruff & Premack, 1978) and are less immediate than lower-order forms in that they require an integration of multiple forms of information including the perception of emotion and intention in the moment knowledge of social and societal rules (Nowicki, 2017). In simple words, the intermediate levels consist of understanding the complex cognition that results in the mental states of others (theory of mind) and considering its influence on their behavior (perspective taking) while constructing the social context within one's framework of thought (Kanie, 2016). The higher-order forms would include attribution of behavior and assimilating the social context as well as implicit norms of a given situation (Couture et al., 2006).

Although social cognition entails abstract reasoning and judgment, that is for mandated careful deliberation and deduction of implied social norms and rules, it also requires some basic cognitive processes of other domains (David L. Penn et al., 1997). Non-social cognitive processes, as these are called, include attention, cognitive flexibility, schematic inference, and memory. These are processes that affect social cognition indirectly (D.L. Penn et al., 2007). Social Cognition is a vital process that needs to be present for social and adaptive functioning in people to function within the societal norms (Lo & Siu, 2018). These skills are found to be largely affected in a wide variety of populations within the mental illnesses, especially those in the psychotic spectrum. Deficits in social cognition are present in almost all mental illnesses, but different aspects are found to be impaired in different illness (Ladegaard et al., 2016; D. L. Penn et al., 2007), which are discussed below in detail

Schizophrenia

Initially, it was called dementia praecox as referred to by Emil Kraepelin. Later, it was Eugene Bleuler that coined the term Schizophrenia, to emphasize the schisms, or split in the thought, perception, and emotions of a person (Lysaker et al., 2010). It was believed that the various cognitive abilities of an individual were fragmented and therefore resulted in the disintegration of one's psyche. Accordingly, many studies show people with schizophrenia experience significant difficulties both forming and scrutinizing complex ideas about themselves, other people, and challenges in daily life i.e., Metacognition (Lysaker et al., 2010).

Poor metacognitive knowledge may lead to difficulty in forming a coherent sense of oneself and affect-based problem-solving ability that encompasses evaluating one's capacities along with various other aspects of self. This loss of ability to form integrated ideas about oneself, resulting in reductions in complex goal-directed behavior impairments is found to be more severe in patients with schizophrenia (Lysaker et al., 2017). One of the dimensions of metacognition, Mastery was found to be linked to preferred coping style, self-esteem, and anxiety in patients with schizophrenia. The higher the levels of mastery, the greater levels of insight and adaptive coping strategies were elicited, along with greater self-esteem and lesser anxiety (Lysaker et al., 2011). Another research studied the metacognition patients had about memory recall based on their "feeling of knowing" and found they were accurate as control groups. The study concluded that though the patient was able to monitor the memory i.e., their metacognitive awareness was intact, their ability to control or implore strategies to regulate it was impaired (Bacon & Izaute, 2009). It can be theorized that in

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people with schizophrenia, Metacognitive knowledge about the information that one is aware of is inadequate. This may lead to misinterpretation of their experiences or, poor metacognitive experience. They may perceive an event to be more hostile than had intended as they believe they have all information necessary to conclude hostile intentions, owing to insufficient metacognitive knowledge (Green et al., 2008). Additionally, poor regulatory strategies of their cognitions reinforce their delusions i.e., they may fail to recognize their beliefs maybe be faulty and leads to delusional thinking. Metacognitive Therapy exerts beneficial effects on some cognitive and symptomatic parameters. Patients undergoing this therapy were less likely to jump to conclusions and experienced lesser delusion-induced distress (Moritz et al., 2017). Results of a study suggested that different domains of metacognition may be influenced by and influence different neurocognitive processes (Lysaker et al., 2015). It was seen that disturbance in Oxytocin is linked with deficits in metacognition and may interact with other forms of cognitive deficits, interfering with the person's abilities to form a complex and integrated sense of self and others (Aydin, 2018).

Metacognitive skills may be viewed as a key factor while considering community-based rehabilitation. Supportive evidence comes from research by Quiles et al., (2013) who suggested that metacognitive deficits more strongly predict community functioning levels in persons with schizophrenia than cognitive deficits. In another study, Metacognition was proposed to be critical to translating cognitive and functional skills into real-world contexts, and this relationship was found especially at the early stages of illness (Davies et al., 2017). Another relevant finding was made in research by Rabin et al., (2014) which studied the relationship between metacognition and social quality of life. The study obtained results that suggested that the self-reflectivity scale of metacognition was found to correlate with negative symptoms of schizophrenia, but not with the social quality of life. Forming complex representation of Others' minds on the other hand was found to significantly correlate with the social quality of life and this relationship was mediated by negative symptoms of schizophrenia (Rabin et al., 2014).

Individuals with schizophrenia frequently exhibit a wide range of communicative-pragmatic disorders (Bosco et al., 2016) which may impact their social quality of life. Previous studies reported deficits in the comprehension of non-literal and figurative forms of language, such as indirect speech acts, deceit, irony, metaphors, and idioms, as well as deficits in conversational and narrative skills (Kantrowitz et al., 2013). While a patient with predominantly negative symptoms or formal thought disorder shows lower-level deficits, patients with paranoid schizophrenia can perform higher-order functions like the theory of mind, ascribe mental or affective states and intentions to people, nevertheless, they are inaccurate (Bosco et al., 2016). Attention must be drawn to the nature of deficit as in case of negative symptoms like poor eye contact or lack of vocal inflection usually considered a reflection of flattened affect might be considered an affective response that may not improve with treatment, however, the social skills is found to improve with treatment. Consequently, the nature of the deficits must be explored comprehensively (Dworkin, 1992). However, the variation in the nature of deficits of social cognition clearly leads to impairments in the social functioning of patients with schizophrenia (Penn et al., 1997). This notion was supported in another study, where it was concluded that the relationship between social cognition and the functional outcome depends on the specific domains of each construct were examined. There was a fairly consistent relationship between Social Perception and various domains of functional outcome, particularly social problem-solving social behaviour, and community functioning. Furthermore, Emotion Perception appears to have a

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fairly consistent, yet modest, relationship with community functioning, social skill, and social behaviour while the influence of the theory of mind and attribution style was inconclusive (Couture et al., 2006).

Difficulty in understanding the mental states of others or poor theory of mind might lead to faulty attribution of the behavior of people (Roux et al., 2016). Moreover, the abstract and conceptual information held by patients with schizophrenia about various social interactions were simple as opposed to elaborate schemas in normal controls of a research study. In alternative terms, they were more likely to profligate into a conclusion without considering complex cognitive capacities that may constitute a behavior (David L. Penn et al., 1997). In a meta-analysis on the theory of mind profiles in people with Autism Spectrum Disorder and Schizophrenia, it was concluded that though there were deficits found among both disorders, the nature of the profile was different (Macdonald et al., 2018). In ASD understanding of speech was found to be most impaired while the intention of speech was most impaired in Schizophrenia. Furthermore, another study that focused on the implicit process underlying the external deficit of social functioning in schizophrenia found that visual processing of information was not automatic in patients with schizophrenia when compared to controls (Murphy et al., 2018). This was studied through the eye-tracking of participants. It was noted that people with schizophrenia spent lesser time on relevant social information in a photograph and greater fixation on non-social information. This indicates the underlying internal deficits that could cause poor social cognition and rehabilitation and can focus on it to improve functionality in schizophrenia patients. A theory of Dopamine functions and its role in cognitive deficits suggests that dopamine reduces the signal and noise ratio, facilitating a person's ability to focus on relevant information against a background of various stimuli (Cohen & Servan-schreiber, 1993). The social processes that are aberrant in schizophrenia may each require their specific therapeutic intervention. Accordingly, training programs that target facial emotion perception and mentalizing deficits have been validated in individuals with schizophrenia (Green et al., 2015).

Depression

Depression has been associated with impairments in memory, reaction time, thinking, attention, concentration, and other cognitive tasks. Brand, Jolles, and Gispen-de Wied (1992) found that both mnemonic deficits and executive impairment, possibly selective for set-shifting tasks, were present in depression. Austin, Mitchell, and Goodwin (2001) suggest that retrieval and encoding of information into memory may be impaired in depression, especially at the beginning of a task when demands on the cognitive effort are high. Positive metacognitive beliefs about worry and rumination as an effecting coping method and negative metacognitive beliefs about controllability were found to be strong predictors of worry in depression (Cartwright-Hatton and Wells, 1997; Papageorgiou and Wells, 2001). Patients with depression had metacognitive knowledge in terms of awareness of their ruminations and worries. However, they had poor metacognitive regulatory skills. They had beliefs that these cognitive processes helped to cope with their everyday problems and constructively develop into a better person: For example, a belief that evaluating "why I am a failure, will lead me to be a better person" may perpetuate their ruminations about being a failure (Wells, 2009). Studies show that these beliefs also affect the person's perceived control over the situation and their symptoms (Clark et al., 2003).

A large amount of research points out that Cognitive therapy reduces depressive relapse, however, the exact processes that underlie this change are not well understood (Beck, Rush,

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Shaw, & Emery, 1979). The original cognitive model suggested that vulnerability to major depression depended on certain persistent underlying dysfunctional attitudes or assumptions (Beck, Epstein & Harrison, 1983). Cognitive therapy focuses on the cognitive distortions or errors in the thinking style of the person and correcting, rather than addressing hope to regulate this thinking. The recurrent styles of thinking are usually brought into awareness through metacognitive therapy. Metacognitive therapy could foster a decrease in the relapse of the depressive episode as well. While cognitive therapy does increase metacognitive awareness, Metacognitive Therapy increases metacognitive regulation, preventing relapse (Hayhurst et al., 2005). Metacognition levels correlate with depression levels in people (Russell and Seeley, 2015) indicating that it directly or indirectly results in changes in the level of depression that people experience. Research that focused on the change in metacognitive and social cognition levels across the course of depression found that the ability to form complex representations of others did not show significant change over the course of depression. It could imply that this deficit may not fully develop until after complete remission and some amount of self-reflection has occurred (Ladegaard et al., 2016). This skill could be nurtured through therapy and might show faster growth and recovery. A single case study focusing on the metacognitive skills in a patient with depression during therapy.

The most severe impairment was found to be in the use of metacognitive skills to solve interpersonal problems, which was found to gradually increase with therapy (Lebois et al., 2016). Concurrent findings come from a study by Strand et al., in 2018 where it was empirically observed that Metacognitive Therapy in depression decreases interpersonal problems as well and concluded that further research needs to be conducted to account for this influence. Analyses of subjects' social skills in interactions by Segrin (1992) indicated that depression is associated with a partial social skill deficit, most notable in terms of excessive social anxiety, low motivation to communicate with others, low social expressivity, and diminished behavioural involvement. These social skill deficits could be theorized to be the result of various levels of social cognition impairment. On the lower level of social cognition, perception and response to emotional stimuli are affected. They are more likely to attend to mood-congruent or sad facial reactions (Ladegaard et al., 2016).

At the intermediate level, they have difficulty in gauging the mental state of others in pictures. This could be manifested as one of the cognitive triads associated with depression i.e., negative view of others (Coyne & Gotlib, 1983; Ladegaard et al., 2016). In a study, it was concluded that a negative bias in facial emotion processing, specifically an increased tendency to interpret ambiguous, neutral, or other emotional expressions negatively, may contribute to impaired interpersonal functioning in major depression (Porter et al., 2010). Supporting evidence comes from a review article on social cognition and depression (Weightman et al., 2014). Most studies that were reviewed had similar findings i.e., participants with depression were more likely to perceive negative emotions and attitudes than healthy controls. Some of the review articles also had findings suggesting that the severity of depression was linked to difficulty in perceiving positive emotions in faces. People with depression were also most likely to misattribute subtle facial expressions as being of higher intensity. The evidence for a higher level of social cognitive impairments especially in context inference comes from several studies that have found that people with depression perceive the environmental stimuli differently when compared to control groups; they are more likely to report the videotape of interaction as negative than the control group (Coyne & Gotlib, 1983). Additionally, results also indicate that first-episode depressed

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patients experience difficulties in all domains of higher-order social cognition (Ladegaard, N., Larsen, E. R., Videbech, P., & Lysaker, P. H. 2014).

Another review article of social cognition on depression obtained results that suggested that there is a significant amount of impairment in social functioning in depression, but this impact, though pervasive, is largely ignored and could be due to a standardized criterion for assessing and understanding the deficits in social functioning associated with depression (Hirschfeld et al., 2000). It is also possible that the low level of social functioning associated with depression can be ascribed partially to a Theory of Mind deficit. Patients with depression could faultily assume that people do not like them or do not want to talk to them resulting in decreased initiation of social interactions. Consequently, it is of paramount importance that it should be addressed in the treatment of depression (Wolkenstein, L., Schönenberg, M., Schirm, E., & Hautzinger, M, 2011). Patients performed better on most tasks of social cognition when in remission relative to when they had been symptomatic. Also as anticipated, the performance of patients in symptomatic remission on social cognition measures was somewhat poorer than that of healthy controls (Ladegaard et al., 2016). Another finding of the study was that the social deficits found in patients with depression appear to be at least partially state-dependent that is, the social cognition improves as the patient moves towards remission. However, even upon complete remission, some mild deficits are still found within the patients with depression, indicative that there could be a trait component that might be involved. Therefore, it is important to account for and focus on these skill deficits when treating patients with schizophrenia or depression to foster a better functional outcome in these individuals.

Need and Significance of the study

A review of the literature indicates that there are deficits in both metacognitive skills and social-cognitive skills in patients with depression and schizophrenia. While deficit in Metacognition is found to correlate with the deficit in social cognition, Metacognitive Therapy has been indicated to reduces interpersonal issues as well. However, a predictive relationship between the two constructs has not been explored. This will be the focus of the study. The results of this study would provide insight into the aspects of metacognition that influences social cognition and thus help improve in providing intervention to the two disorders

METHODOLOGY

Research Design

Quantitative Research Design was adopted. A correlational design was used to understand the relationship between metacognition and social cognition. The study used a semi-structured interview method and clinician rating scales to collect data.

Aim

The study aimed to compare the levels of impact of Metacognition and Social Cognition between patients with Schizophrenia and Depression

Objective

- To see if there is a relationship between the dimensions of metacognition and social cognition.
- To see if there is a difference in the levels of dimensions of Metacognition and Social cognition between patients with Schizophrenia and Depression.

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Hypothesis

- Alternate Hypothesis (H1): There is a significant impact of dimensions of metacognition and social cognition.
- Alternate Hypothesis (H2): There is a significant difference in the levels of dimensions of Metacognition and social cognition between patients with Schizophrenia and Depression.

Sample

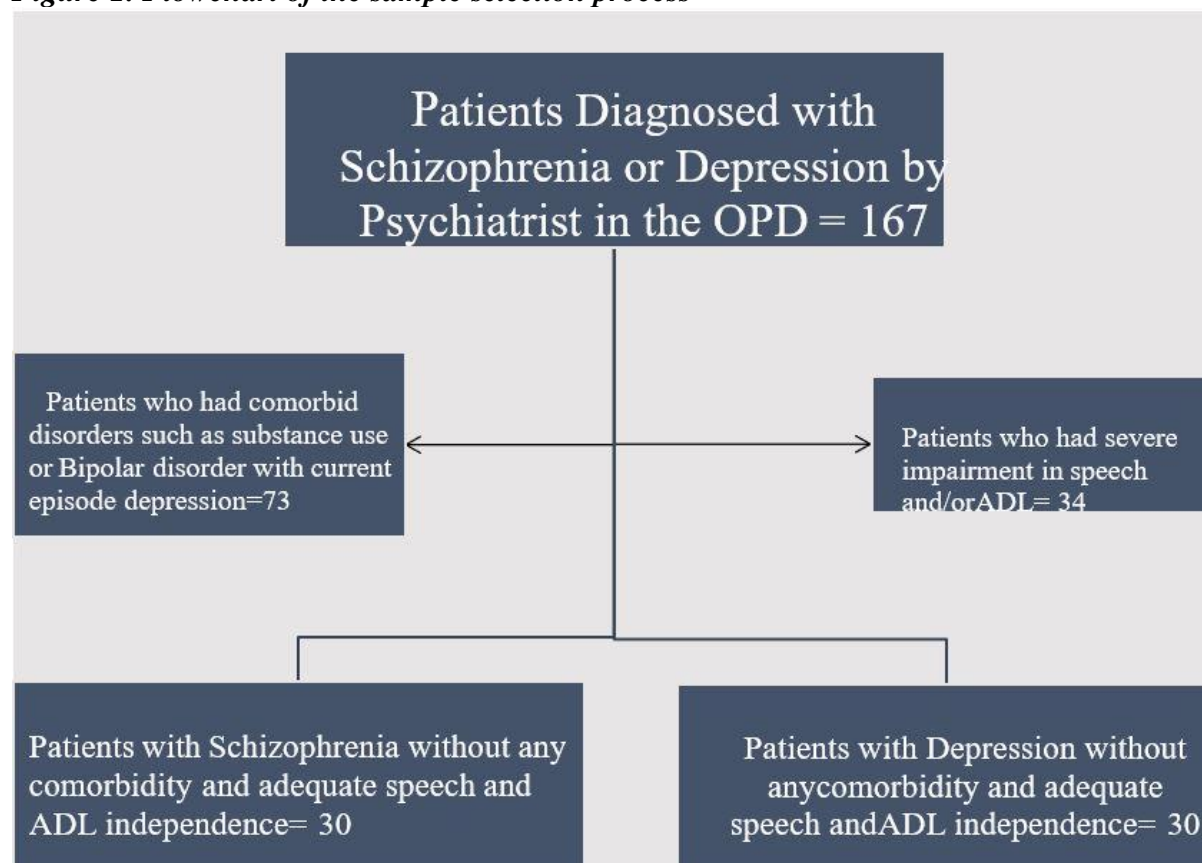
Subjects included patients who had been diagnosed with schizophrenia or with depression by the Psychiatrists in the Outpatient Department of Institute of Mental Health, Chennai.

Inclusion Criteria: Patients who have partially dependent or fully independent Activities of Daily Living; Patients who are maintaining well, under remission of symptoms with speech functioning ability in more than phrases.

Exclusion criteria: Patients who are having schizophrenia or depression for more than 20 years; Patients with any other comorbid psychiatric disorders

The sample size was 60 participants. The sample consists of 30 patients with schizophrenia and 30 patients with depression. Figure 1 shows the sample selection process flowchart.

Figure 1. Flowchart of the sample selection process



The sampling method used was a convenient sampling in the Institute of Mental Health, Chennai, India. The participants were selected based on the accessibility and proximity of the researcher.

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Data collection method

Data was collected through Semi-Structured Interviews, Questioning, and Tasks.

Description of tools

Demographic questions like Name, Age, Sex, Duration of illness, Education, were elicited.

Indiana Psychiatric Illness Interview (IPII): It is a semi-structured interview format developed by Lysaker et al., (2002). It is used to assess the illness narrative of the individual. It lasts between 30 mins to 60 mins, depending on the interviewee. The interview is divided conceptually into five sections. In the first section, General Free Narrative, rapport is established, and participants are asked to tell the story of their lives in as much detail as they can. In the second section, Illness Narrative, participants are asked if they think they have a mental illness, what could have caused it and how they understand it, how they feel about having one, and how it might progress. This is followed by the third section, Changes, with questions about what has and has not been affected by their condition in terms of vocational, personal, interpersonal, or social and psychological (cognition/emotion) life. In the fourth section, participants are asked whether and, if so, how their condition 'controls' their lives and how they 'control' their conditions. In Degree of influence of Illness Construct, the Fourth section, participants are asked how their condition affects others and how others affect it. The section seeks to elicit the strategies that have been employed to control or manage the illness and the level at which the illness has been addressed as well. Finally, they are asked what they expect to stay the same and what will be different in the future.

The questions asked are non-directive and open-ended, therefore responses will act as a narrative based on which scoring can be done. The IPII has been used in multiple research studies as a means of eliciting the metacognitive skills of individuals (P. H. Lysaker et al., 2010; Paul H. Lysaker et al., 2010, 2015; Semerari et al., 2003)

Positive and Negative Syndrome Scale (PANSS): It is a clinician-based rating scale for assessing the severity of schizophrenia based on the positive and negative symptoms as well as their general psychopathology (Kay et al., 1987). The scale does not have norms or a cut-off; it is a severity scale and not a diagnostic scale meaning that is administered only after a diagnosis of schizophrenia has been made to understand the symptom severity. The scale takes 15 to 20 mins to administer. It can be administered only by a trained clinician. The scale has 3 subscales, and each item is rated from 1 to 7, 1 indicates the absence of a symptom, 2 indicates mild, 3 suggests minimal, 4 is moderate, 5 is moderately severe, 6 indicates severe and 7 indicates an extreme level of symptoms.

The Positive syndrome scale assesses the positive symptoms associated with schizophrenia, which in other words are disturbances sensory, motor, or cognitively excessive than in the normal population. It has 7 items and each item is rated from 1 to 7, based on detailed description and guidelines given along with the scale. The items are Delusion, Conceptual Disorganisation, Hallucinatory Behaviour, Excitement, Grandiosity, Suspiciousness/Persecution, and Hostility. Similarly, the Negative Syndrome scale assesses the negative symptoms that are associated with schizophrenia which are, disturbances sensory, motor, or cognitively decreased than in the normal population. It has 7 items which are also rated from 1 to 7 based on the most suitable corresponding description provided. The items are Blunted

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Affect, Emotional Withdrawal, Poor Rapport, Passive/Apathetic Withdrawal, Difficulty in Abstract Thinking, Lack of Spontaneity, and flow of thinking, and Stereotyped Thinking.

The third scale, general psychopathology, does not contribute to the overall score, but adds to a better understanding of the phenomenology of the patient, considering the varied presentation of schizophrenia. There are 16 items which are also rates from 1 to 7. The items are Somatic concern, Anxiety, Guilt feelings, Tension, Mannerisms & posturing, Depression, Motor retardation, Uncooperativeness, Unusual thought content, Disorientation, Poor attention, Lack of judgment & insight, Disturbance of volition, Poor impulse control, Preoccupation, and Active social avoidance. The composite score is typically obtained by subtracting the total score on the Negative scale from the Positive Scale. If the obtained score is positive, it is concluded that there are predominant positive symptoms and predominantly negative symptoms if the obtained score is negative. However, for the purpose of research, the greater score between the two scales is taken as the composite score does not provide an accurate picture of the severity of the illness, and the General Psychopathology subscale is not used. The research study seeks to understand if the illness severity has an influence on the variables and so, only the score on the positive scale or negative scale based on the predominant symptom excluding the composite score and general psychopathology scale.

The internal reliability (α) of the Positive and Negative Scale was .73 and .83 respectively and that of general psychopathology was .79. The test-retest reliability (Pearson's ρ) was .80, .68, and .60 for Positive, Negative, and General Psychopathology scale respectively.

The construct validity, measured by a correlation between the positive and negative scales was .27 (Pearson's ρ) suggesting only a minimal level of similar excluding which the two scales measure different aspects (Kay et al., 1987).

Beck's Depression Inventory (BDI): It is a self-report measure that assesses the level of severity of depression. It was constructed in 1961, by Aaron Beck. BDI is also administered after a diagnosis of depression to assess its severity and is not a diagnostic tool. It has 21 items and each item has four statements and the individual selects the one most suitable for her/him. A score of 0 to 3 is given for each item based on the statement chosen. For example, in the first item, the statement "I do not feel sad" would be scored 0, "I feel sad" would be 1, "I feel sad all the time and I can't snap out of it" is 2, and "I feel so sad and unhappy that I can't stand it" would be scored 3.

The score for BDI is obtained by adding the scores obtained in each of the 21 items. A minimum of 0 and a maximum of 63 can be obtained. A score of 11 to 18 is indicative of mild depression, 19 to 29 is considered a moderate level of depression, and 30 and above is suggestive of severe levels of depression.

Beck's Depression Inventory has been used extensively in various settings across various countries. The average internal reliability for psychiatric populations was 0.88 and the corresponding score for non-psychiatric conditions was 0.82. The convergent validity ranges from 0.58 to 0.79 (Richter et al., 1998).

Metacognitive Assessment Scale (MAS): It is a rating scale for metacognition in people developed by Paul H Lysaker in 2004. The rating is provided based on the abilities that were

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spontaneously elicited in the IIP. There were significant intraclass correlations for all the four MAS-A subscales. These ranged from $r = 0.61$ ($p < 0.05$) for D to $r = 0.93$ ($p < 0.0001$) for the total score, indicating appropriate levels of internal consistency. A significant degree of test-retest stability with the following intraclass correlations: S: 0.88; O: 0.70 D: 0.68 M: 0.73 and Total: 0.85 is also present for the scale. The 4 subscales are:

- **Scale S: Self reflectivity** This scale measures self-reflectivity or one's ability to form representations of oneself that are increasingly complex and integrated. It stretches from the mere experience and recognition of mental events within one's mind to the telling of a complex personal narrative that portrays the narrator as composed of a complex array of interacting intentions, thoughts, and feelings. Lower scores may reflect merely an ability to identify one's thoughts as one's own and to recognize that one has different cognitive operations and emotions. Moderate scores may reflect the ability to understand the subjectivity of one's thinking and to recognize the difference between fantasy and reality. Higher scores may reflect an understanding of the relationship between thoughts, emotions, and other social or interpersonal variables across different life events. A minimal score of 0 and a maximum of 9 can be given, based on the corresponding abilities that the person exhibits during the interview.
- **Scale O: Understanding of the Other's Mind** This scale measures one's ability to form increasingly complex and integrated representations of another person. It refers to an awareness of a particular person or a well-recognized group, such as a family, and not a nebulous "they" or "other people." It stretches from a mere awareness that others experience mental events to the construction of complex accounts of the lives of others. Lower scores may reflect the mere ability to recognize that others have unique thoughts or the ability to distinguish the different cognitive operations and emotions that others employ or experience. Higher scores, on the other hand, may reflect the ability to understand the relationship between thoughts, emotions, behaviors, and developmental or interpersonal variables. A minimal score of 0 and a maximum of 7 can be given, grounded on the equivalent capacities that the person displays during the interview. This subscale does not require a precise understanding of others' intention or attribution of behaviour, as does social cognition, but rather an awareness of the presence of complex cognitive abilities in others mind.
- **Scale D: Decentration** This scale measures one's ability to recognize that other people lead lives that may intersect with the participant but that the lives of others concern much more than the interests of the participant and that the participant is consequently not the center of the lives of others. As such this scale reflects the ability of participants to situate their ideas of themselves in the larger social world. At lower levels, all events are understood by participants as being about them while at higher levels, participants recognize that there are multiple valid viewpoints and each person is pursuing his or her way through life. A minimal score of 0 and a maximum of 3 can be scores, according to the matching capabilities that the individual shows during the interview.
- **Scale M: Mastery** This scale measures an individual's ability to utilize metacognitive knowledge about oneself and others to cope with psychological problems which are a source of distress. This scale is not a measure of general problem-solving ability, but rather a measure of the ability to use the metacognitive knowledge reflected in the other scales to master problems specifically related to mental health. Self-destructive attempts to reduce pain are not recorded as

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meaningful ways to cope on this scale. A minimal score of 0 and a maximum of 9 is provided, according to the agreeing descriptions of aptitudes that the individual demonstrates during the interview.

Social Cognition Screening Questionnaire (SCSQ): It is a task-based test that takes 20 to 30 minutes to administer developed by David Roberts in 2009 (Lo & Siu, 2018). It contains five subscales: verbal memory, schematic inference, Theory of Mind (ToM), metacognition, and hostility bias. The task comprises 10 short vignettes presenting an interaction between a fictional character and the study participant. Each vignette was read aloud by the tester. The vignette will be repeated once again upon the subject's request. The tester then had the subject respond 'Yes' or 'No' to three questions about the vignette, addressing verbal memory, schematic inference, and ToM. ToM items were designed to assess both ToM and hostile attributional bias. Questions were presented in a random order, and subjects were then asked to rate their confidence level in their answer to the last question to assess their metacognitive confidence levels. The total scoring ranges from 0 to 29, and is computed by summing the Theory of Mind, Schematic Inference, and Verbal Memory scales, and then subtracting from this total the Metacognitive Overconfidence score.

Theory of Mind represents the extent to which an individual is accurately able to perceive others' state of mind and intent. A score of 6 or below indicates clinically significant impairment in social cognition. A maximum score of 10 can be obtained on both theory of mind and schematic inference scales.

The Schematic Inference is designed to tap overlapping aspects of social cognition (social perception) and higher-level aspects of basic cognition (working memory, abstraction).

Hostility bias is the tendency to attribute hostile intention in an ambiguous situation. The range on this scale is 0 to 5, with higher scores indicating greater hostility bias. The normative mean was 0.3, with a standard deviation (SD) of 0.6. Therefore, scores of 2 or greater on this scale are suggestive of clinically significant hostile attributional bias. This interpretation is most valid for scores of 3 or greater, and it is less reliable if the respondent received a Theory of Mind score of 5 or lower, or a Verbal Memory score of 6 or lower.

Verbal memory represents the extent to which people remember details of an interaction. It is assessed as it is one of the non-social cognition domains that mediate social cognition. The normative mean on this scale is 8.2 out of 10, with a standard deviation (SD) of 1.2. Therefore, scores of 6 or lower (2 SD's below the normative mean) suggest clinically significant impairment in verbal memory. Significant verbal memory impairment is likely to contribute to poor performance on the ToM and Schematic Inference scales.

Metacognitive overconfidence is calculated using the ten "D" items (1-D, 2-D, etc.), which represents the average level of confidence for those D items that correspond to incorrectly answered C items.

Process

The research was carried out in 3 phases.

1. Phase 1: The nature and purpose of the study were explained to the participants and their consent verbal and written was obtained. Responses are audiotaped with consent

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2. Phase 2: Patients was administered tools in the following order: IIPI, PANSS/BDI, and SCSQ
3. Phase 3: A blind rater, who was trained and well-versed with utilizing the MAS manual, rated the patients on MAS. The inter-rater reliability was also calculated. The information that was collected was stored in a password-protected laptop for further analysis.

Data Analysis

- Descriptive statistics like Mean, Standard deviation, frequency, and Percentage were calculated for the demographic details.
- The interclass coefficient of correlation under absolute correlation was computed to obtain the inter-rater reliability. Among all 4 subscales, the coefficients ($r=.844$, $r=.856$, $r=.836$, $r=.894$) are significant at the $p=0.01$ reflecting a strong positive relationship between the researcher and the blind rater. This indicates that the scoring of the MAS-A is objective and reliable.
- An Independent Sample T-test was used to compute the difference between the dimensions of metacognition and social cognition in patients with schizophrenia and depression.
- Pearson's coefficient of correlation was computed between various dimensions of metacognition and social cognition for the entire sample and as well as for patients with schizophrenia and depression separately.
- Regression analysis was performed using the Enter method of Linear Regression to compute the impact of dimensions of metacognition on social cognition for the entire sample.

Ethical considerations

- Ethical Procedure. The study followed the APA format of ethical consideration and was approved by the Institutional Ethics Committee of the Institute of Mental Health, Madras Medical College (No. 35072019), where data was collected.
- Risks Involved. The participants were informed of the possible risk of emotional disturbances during or post participation in the study.
- Consent form. The participants were given a consent form which will include the details about the study and the author's contact information before participating in the research.

RESULTS AND DISCUSSION

This chapter contains the important tables and significant results that were obtained after the analysis of the data. Following this, there is a discussion that attempts to explain and justify the results that have been obtained. Figure 2 shows the demographic details of the participants. It can be seen that there is a higher number of males in the schizophrenia and depression sample population. The predominant education level of patients with schizophrenia appears to be middle school, while that of depression appears to be under-graduation. It can also be seen from figure 2 that the sample appears to be having less than 5 years since the onset of illness in the case of depression and more evenly distributed in the case of schizophrenia. The average age of the sample to be 34 years and the standard deviation of 11.8 indicates a large variation in sample age. The average age of Schizophrenia (39 years) is much higher than depression (29 years).

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Figure 2. Sociodemographic Characteristics of Participants

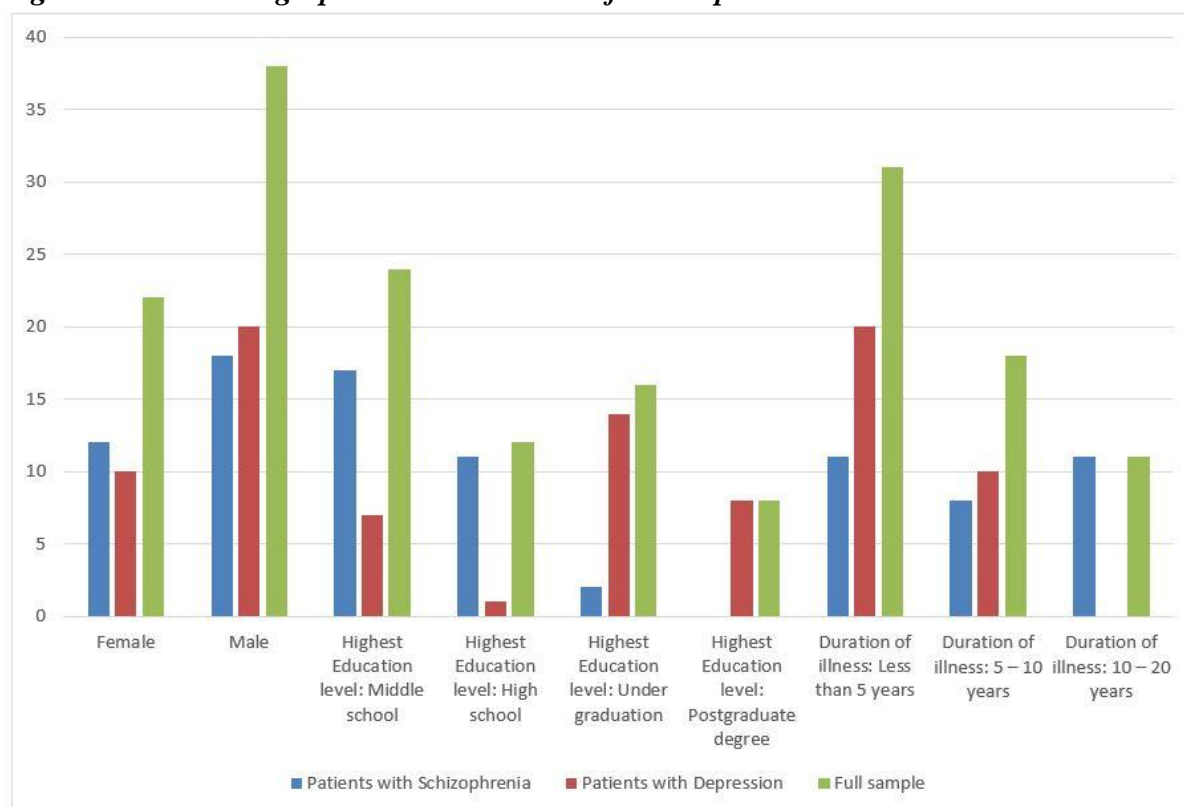


Table 1 Descriptive statistics and Pearson's Coefficient of correlation (r) between the various dimensions of Metacognition and Social Cognition

	M	SD	1	2	3	4	5	6	7	8	9	10
1 Self-Reflectivity	5.32	2.12	-									
2 Awareness of the Other's Mind	3.64	1.90	.914**	-								
3 Decentration	1.50	0.95	.797**	.803**	-							
4 Mastery	3.57	1.81	.829**	.805**	.686**	-						
5 Theory of Mind	5.67	1.40	.294*	.318*	.078	.329*	-					
6 Schematic Inference	6.57	1.45	.510**	.556**	.518**	.481**	.327*	-				
7 Verbal Memory	7.57	1.84	.428**	.311*	.403**	.439**	.274	.549**	-			
8 Metacognitive Overconfidence	1.74	0.81	-.114	-.033	-.164	-.050	.027	-.150	-.237	-		
9 Hostility Bias	2.41	1.13	-.263	-.259	-.106	-.349*	-.712**	-.219	-.213	.091	-	
10 Social Cognition	18.06	3.85	.529**	.482**	.451**	.522**	.613**	.791**	.836**	-.370**	-.441**	-

** Correlation is significant at the 0.01 level * Correlation is significant at the 0.05 level

From table 1, in the Metacognition scale, the mean of Self-reflectivity, Awareness of others' mind and, Decentration are in the average levels while the mean of Mastery is found to be on the lower end. Among the Social Cognition dimensions, the mean of the theory of mind

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(<6) indicates clinically significant impairment while the mean score of Verbal Memory (>6) is within the normal range. The mean hostility bias is on the higher level, closer to the clinically significant score of 3. The results from table 1 indicate a moderately strong positive relationship between the dimensions of Metacognition and Social Cognition which is significant at $p=0.01$ level.

Table 2 *The results of the Regression analysis between the various dimensions of Metacognition and Social Cognition*

	Mean	Standard deviation	R	R Square	F	Standardized Coefficient (Beta)	T
Self-Reflectivity	5.32	2.12				.343	.327
Awareness of the Other's Mind	3.64	1.90	.553	.306	4.843*	-.128	.702
Decentration	1.50	0.95				.089	.687
Mastery	3.57	1.81				.280	.229

* $p<0.05$

From table 2, it can be seen that though there is a moderate positive relationship between the dimensions of metacognition and Social cognition in patients with depression as seen from the value of r (.553). R^2 value indicates that the dimensions of Metacognition together, predict 30.6% variability in Social Cognition, which is significant at $p=0.05$. However, the values of the Beta Coefficient and t values indicate that the dimensions of Metacognition do not individually contribute significantly towards changes in Social Cognition. Therefore, the alternate hypothesis (H_1) that "There is a significant impact of dimensions of metacognition and Social cognition in patients with Schizophrenia and Depression" is accepted.

Table 3 *Results of the T-test between patients with schizophrenia and depression across the various dimensions of Metacognition and Social Cognition*

	Schizophrenia		Depression		t	p
	Mean	Std. Deviation	Mean	Std. Deviation		
Self-Reflectivity	3.833	1.5370	6.760	1.5554	-.623**	.000
Awareness of Other's Mind	2.375	1.3290	4.860	1.5446	-6.026**	.000
Decentration	.958	.8836	2.020	.6994	-4.674**	.000
Mastery	2.29	1.112	4.80	1.472	-6.709**	.000
Theory of Mind	5.38	1.209	5.96	1.541	-1.475	.147
Schematic Inference	5.71	1.268	7.40	1.118	-4.960**	.000
Verbal Memory	6.79	1.978	8.32	1.376	-3.151**	.003
Hostility Bias	2.63	1.013	2.20	1.225	1.326	.193
Metacognitive Overconfidence	1.83	.82	1.66	.80	.709	.482
Social Cognition	16.04	3.74	20.01	2.88	-4.16**	.000

** $p<0.01$

The results from table 3 show that the values are significant at $p=0.01$, indicating there is a significant difference between the scores of dimensions of Metacognition between patients

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with Schizophrenia and Depression. From table 3, it can be seen that though the only the schematic inference and verbal memory subscales show a significant difference in means, there is an overall significant difference in Social Cognition between patients with schizophrenia and depression. It is concluded that the Alternate Hypothesis (H2) that “There is a difference in the levels of dimensions of Metacognition and social cognition between patients with Schizophrenia and Depression” is accepted.

DISCUSSION

The current study focuses on the levels of metacognition and social cognition in patients with schizophrenia and depression. Data was collected through semi-structured interviews and questionnaires. Data analysis was carried out and the major finding of the study is that there is a moderately strong positive relationship between the various dimensions of metacognition and social cognition. Another important finding is that there is a significant difference in the level of metacognition and social cognition between patients with schizophrenia and depression.

The correlation levels between self-reflectivity of metacognition and social cognition are the strongest. Self-reflectivity is the ability to for increasingly complex and integrated ideas of self. The increased levels of self-reflectivity presumably are associated with increased metacognitive knowledge about self which contributes to one's capacity to infer the appropriate social response in various situations. Within the dimensions of social cognition, self-reflectivity, or the ability to distinguish various mental states within oneself and recognize patterns of thinking of self is linked with the ability to accurately perceive the mental states of others (Theory of Mind). Being aware of the various thoughts and feelings within self could possibly help to accurately gauge their mental state. There is a negative relationship between Self reflectivity, and hostility bias as well as with Metacognitive overconfidence subscales of Social Cognition. The metacognitive regulatory practices in an individual will be based on the person's increasing levels of self-reflectivity or metacognitive awareness, aim at decreasing any possible bias or errors in judgment. However, the weak strength of the relationship suggests other factors could contribute to these dimensions.

The Awareness of Other's Mind and Social Cognition have a significant positive relationship. This is in line with previous research findings that showed a strong positive relationship between Awareness of other's minds scale and social quality of life (Rabin et al., 2014). The ability to attribute complex mental states and emotions to other people could lead to an increase in levels of the capacity to attribute a wider set of causative reasons to a person's behaviour which is more likely to resemble the real-world social situations, indirectly increasing their social cognition. This is also seen from the significant positive correlation between Awareness of Other's mind and theory of mind in Table 4. Additionally, the subscale also has a negative relationship with hostility bias, which could be a result of the wider causative reasons that the individual which increases with growth in awareness of the complex emotions and thoughts in others. Wider causal attribution will lead to a decrease in the tendency to accredit hostile intentions to others' behaviour.

The Decentration dimension of Metacognition does not seem to have a significant relationship with any of the social components of Social Cognition but does have a significant relationship with the non-social components- Schematic inference and Verbal Memory. The subscale could therefore have a significant positive relationship with Social

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Cognition through its relationship with the non-social components. Decentration is one's capacity to understand other people lead their own lives which only intersect and do not revolve around their life. Increasing levels of this component, that there are multiple viewpoints to a situation may somehow decrease the subjective bias in memory recall, fostering an objective and accurate perception of social situations, consequently increasing Social Cognition.

Mastery or the ability to utilize the metacognitive knowledge one has, to employ effective strategies, has a significant positive relationship with Social cognition. This capacity would naturally facilitate the application of the multifaceted integrated ideas of self to various social situations, utilize the information to send or interpret social cues across multiple circumstances. The Non-social components of social cognition, i.e., schematic inference and verbal memory are also seen to have a significant strong positive relationship with Mastery. Increased ability to make use of one's cognitive capacity and level of functioning understandably, would lead to appropriate metacognitive regulatory practices that would consequently increase the cognitive components like Schematic inference and Verbal Memory in individuals. Mastery also has a significantly negative relationship with hostility bias suggesting that successful employment of metacognitive capacities would result in controlling one's tendency to attribute hostile intentions, presumably due to increased capacity to account for and understand others' perspectives as well as flaws in one's thinking.

The regression analysis suggests that there is a combined significant impact of the components of metacognition on social components, although the individual components do not contribute significantly to Social Cognition. There could be a synergetic effect of the dimensions of Metacognition together that had brought about these results. However, the sample size of only 60 participants, must be kept in mind and could also be one of the reasons that the regression analysis did not produce significant results. Increasing the sample size to 200 would be ideal to perform regression in future researches.

Within the dimensions of metacognition, patients with schizophrenia had significantly lower means than those with depression. The reason for this could be two-fold. Cognitive deterioration is a common feature seen with the increase in the duration of schizophrenia, while depression does not lead to permanent brain atrophy. Depression has temporary reversible cognitive issues like difficulty in memory and concentration, which are relatively restored once the symptoms remit. From the demographics table, it can be seen that over 36% of the sample from schizophrenia have had the illness for more than 10 years, which could have led to significant cognitive decline, while almost 70% of the sample of depression have less than 5 years in duration. A second reason could be the nature of the two illnesses. Schizophrenia, as the name implies, is believed to lead to a fundamental disintegration of one's thoughts and cognitions (Lysaker et al., 2010) while depression is marked by rumination about self and the past. Metacognition, which includes the capacity to identify, differentiate, and form increasingly complex notions of one's feelings, thoughts, and patterns of behaviour would be disrupted by the disintegration of the psyche seen in schizophrenia. In depression, at least in milder levels, rumination may lead to a minimal amount of self-reflection, however, it would not be an accurate reflection of their skills and capacities, leaning towards a lower negative view of self.

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In social cognition, although there is a significant difference in the overall mean between the two populations, the non-social components show a significant difference while the social components do not. Non-social components may be influenced by the cognitive deterioration in schizophrenia result in neurological deficits (Lysaker et al., 2017), and through it, indirectly impact Social Cognition. As seen from the literature review, both patients with schizophrenia and depression deficits in social skills and social cognition but differ in the level of impairment. Patients with schizophrenia focus on non-socially relevant cues, gazing at the background instead of at the person (Murphy et al., 2018), while patients with depression are more likely to pick up mood-congruent negative cues (Ladegaard et al., 2016). As a result of this, participants in both samples will show the theory of mind deficits in Schizophrenia owing to poor amount of information focused on and in Depression, owing to focus only on negative information.

Similarly, hostility bias will also be present in participants with both illnesses. Patients with schizophrenia will perceive hostility along the lines of persecution and paranoia while patients with depression would experience it as rejection. This could be the reason there is no significant difference among individuals in both samples.

Overall, the study suggests that there is a moderately strong relationship between dimensions of metacognition and social cognition. This indicated that addressing metacognition and its components during the therapeutic intervention will be able to foster an improvement in social cognition and through that a faster community-based rehabilitation. Additionally, though there is a significant impact of dimensions of metacognition on social cognition, individual dimensions do not contribute significantly to the changes in social cognition. This suggests the need to expand the study and conduct it with a larger sample population. The significant differences between the aspects of metacognition and social cognition throw light on the phenomenological differences that occur within the two illnesses and the need to tailor the intervention and therapy plan to suit the individuals.

Limitations

The limitations of the present study include that the sample size was smaller than what was expected to be collected. Owing to the lockdown that was in place during the time of data collection, the researcher could not collect further data. The small size of the sample could have led to the lesser significance of the results of the regression. Another limitation could be that the varied phenomenology and types of schizophrenia whose influence has not been accounted for. The research is ex-post facto rather than pre-post intervention. This paper is therefore only could predict a relationship and not provide a definitive causative nature.

Implication and Scope for Future Research

This research can be used as preliminary data for further research in South India for studying the effects of metacognition on social cognition. This could help in addressing the facets that are lacking or frail in an individual to develop metacognitive awareness and regulatory skills which in turn is found to influence interpersonal skills and social cognition, facilitating remission. Future research could also concentrate on having a larger sample. A research design that is causative using a baseline, an intervention of metacognitive therapy, and post hoc analysis can be carried, accounting for the varied phenomenology and cognitive deterioration in Schizophrenia.

SUMMARY AND CONCLUSION

Social Cognition is a vital process that needs to be present for social and adaptive functioning in people to function within the societal norms (Lo & Siu, 2018). These skills are found to be largely affected in a wide variety of populations within the mental illnesses, especially those in the psychotic spectrum. Deficits in social cognition are present in almost all mental illnesses, but different aspects are found to be impaired in different illnesses like schizophrenia and depression (Ladegaard et al., 2016; D. L. Penn et al., 2007). Findings from a study by Strand et al., in 2018 empirically observed that Metacognitive Therapy in depression decreases interpersonal problems and Social Skills. In addition, Metacognition was proposed to be critical to translating cognitive and functional skills into real-world contexts, and this relationship was found especially at the early stages of illness (Davies et al., 2017). Furthermore, the literature review indicates that deficits in Metacognition and deficits in Social cognition have high levels of correlation, but a causal relationship between the two has not been extensively studied. The purpose of the study was to find out the impact of metacognition on social cognition in patients with schizophrenia and depression and to find out if there is a significant difference between the levels of metacognition and social cognition between patients with schizophrenia and patients with depression. A quantitative research design was adopted. 60 participants (Schizophrenia=30, Depression=30) were chosen through convenient sampling.

After obtaining consent, data were collected through semi-structured interviews (IIP), rating scales (PANSS/ BDI), and questionnaires (SCSQ). The interview was recorded after obtaining consent and rated on MAS-A by a blind rater and the researcher. Inter-rater reliability was calculated. The obtained data were correlated and regressed. T-tests were also performed. The results of the study show that there is a significant impact on the dimensions of metacognition on social cognition. However, the dimensions do not individually contribute significantly to the changes in Social cognition though they have a moderately strong positive relationship between the dimensions of metacognition and social cognition. The study also found out that there is a significant difference between the aspects of metacognition and social cognition between patients with schizophrenia and depression.

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Conflict of Interest

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