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Social cognitive deficits and need for social cognitive remediation in schizophrenia

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Abstract

The construct of social cognition provides a perspective on how people process information within social contexts. Social brain evolution is an adaptive response to the increasingly complex social environment. Social cognitive deficits in patients with schizophrenia determine functional outcome. Social cognitive deficits in schizophrenia could serve as targets for novel treatment applications. Culturally validated tools to measure these deficits in the Indian setting have been developed. Social cognitive training has promise in this regard.

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What makes us human? Though it is difficult to put in words, but nevertheless we can try by stating that our unique ability to think, feel, act, and communicate in a coordinated manner within our social milieu is what makes us human. In the last few years, there has been an increasing trend in observing the social cognition in schizophrenia as ‘social abilities’ are impaired in schizophrenia. Social cognition refers to how people think about themselves and others in the social world. The term originated within social psychology during the general “cognitive revolution” of the late 1960s and early 1970s. The construct provides a broad theoretical perspective that focuses on how people process information within social contexts. It includes person perception, causal attributions concerning self and others, and bringing social judgements to decision making, among other elements.[1]

The three primary dimensions to study social cognition are emotion perception, theory of mind (ToM), and attributional style. In a review by Edward *et al.*,[2] in regard to emotion perception (e.g. identifying emotion displayed in various facial expressions or tone of voice), the following conclusions are found[3-5] that individuals with schizophrenia display severe deficits in the perception of negative emotions compared with nonclinical control participants (compared with positive emotions). The deficit in emotion perception is stable over time, although evidence suggests that individuals in remission may outperform individuals in an acute phase of the disorder and individuals with schizophrenia perform worse trying to “read between the lines” (i.e. identifying what a given individual is

thinking or feeling), but are less impaired on more concrete social judgements (i.e. identifying what a person is wearing or doing). And many individuals with schizophrenia display restricted visual scanning and spend less time examining salient facial features during emotion perception tasks.[6,7] Finally, impairments in emotion perception are present early in the course of illness.[8-10]

Mehta[11] had stated that social cognitive deficits mediate the social dysfunction in schizophrenia, and schizophrenia could be understood from a ‘social brain disorder’ perspective. It has been suggested that this disorder represents a costly by-product of the social brain evolution in *Homo sapiens*. *Homo sapiens* are considered as social animals with a highly evolved ‘social brain’ as an adaptive response to an increasingly complex social environment.[12] Charles Darwin in his historical book has suggested that emotions in man have evolved through a process of natural selection, and facial expression is an important means to communicate emotions and intentions.[13] The ability to understand the mental state of others, and recognise facial emotional expressions form an important part of social cognition which also involves face perception, emotional processing, ToM and self-reference, and working memory.[14]

There is a growing evidence for social cognitive deficits in patients with schizophrenia and its importance in determining functional outcome.[15] Recent increase in interest and research in social cognition is based on neuroanatomical association, and this neural network composed of the prefrontal cortex, fusiform gyrus, superior

temporal sulcus, and amygdala, that is involved in processing of social cognition.[16] Most literature on social cognition in schizophrenia comes from patients who are symptomatic, where active positive symptoms can interfere with test administration, comprehension, and inference. While there are studies that have provided promising results indicating social cognitive impairment in remitted schizophrenia, numerous key issues remain that preclude well-founded deductions from these findings.

Though studies from last four decades indicate disturbances in social cognition, social skills, social behaviour, and social functioning, and these have emerged as defining features of schizophrenia but psychometric properties of tools used to assess social cognition were poor.[17,18] Similarly, in India, there has been studies related to social cognition from 1970s till date. Menon and Ramachandran[19] compared social and clinical characteristics of 96 long stay schizophrenia patients and a group of 103 schizophrenia patients who were discharged within six months of admission, and found that marked social withdrawal and socially embarrassing behaviour, low work output, lack of social contact before and after admission, and unemployed status at the time of admission affected the outcome and prolonged hospital stay. Conducting quality research as a clinician is a challenging task in a country like India and standardised tools are lacking, but the National Institute of Mental Health and Neurosciences (NIMHANS) team did a phenomenal job by developing a tool called SOCRATIS, an acronym for Social Cognition Rating Tools[20] in schizophrenia to study the social cognitive deficits. The tool consists of four domains of social cognition, viz. ToM, emotion processing, social perception and knowledge, and attributional bias to assess ToM (first and second order false belief picture stories, metaphor-irony stories, and faux pas stories), social perception (true/false questions asked on social and non-social cues after showing the subjects four each of low and high emotion videos depicting a social interaction), and attributional styles (causal attributions made for positive and negative social events).

Social cognitive deficits in schizophrenia could serve as targets for novel treatment applications, as is seen in a study between the relationship of mirror neuron activity and social cognition in schizophrenia, wherein the researchers demonstrated reduced mirror neuron activity in patients with schizophrenia, which correlated with their social cognitive deficits. This is a novel finding that warrants further research in this area as the researchers also highlighted that the effects of mirror neuron modulation on social cognition would provide significant information about the neural processes underlying complex social cognition abilities, as well as, guide the development of novel brain stimulation based therapeutic applications in schizophrenia. Mirror

neurons are specialised nerve cells, which by their property of firing both during action execution and action observation may provide the template that helps us understand the intentions and emotions underlying particular actions of others.[21]

In schizophrenia, facial emotion recognition deficits (FERD) are correlated with severe symptomatology.[22] Emotional dysregulation is a common feature of most psychiatric disorders ranging from psychosis, mood disorders, and anxiety spectrum disorders. Facial expressions of emotions have been used as probes in many behavioural and neuroimaging studies in various neuropsychiatric disorders.[23] Recent advances in cognitive neurosciences and functional neuroimaging studies show that emotional processing is not an isolated event, but closely mediates cognition and behaviour.[24] Previous studies have shown that schizophrenia patients with positive symptoms tend to over attribute emotions, and also the spatial detection of positive faces are more efficient with increasing anhedonia.[25] These studies indicate that delusional patients are hyperattentive to others' expression.[26]

Keeping the above studies in mind, there is another scale developed in NIMHANS, called TRENDS, an acronym for a tool for recognition of emotions in neuropsychiatric disorders.[27] It is a tool validated for use in the Indian population, which captures the full range and nature of emotional expressions akin to real life situations, and can be utilised for future behavioural and functional imaging studies in Indian patients. Perception of emotion is known to be influenced by ethnicity. Culture is also known to play a role in influencing course and outcome, and planning of multidisciplinary treatments of mental disorders.[28] Keeping the cultural context in mind, these tools were developed in India for Indian population. Though social cognition expression is modulated by several cultural influences, but very few studies have examined social cognition in schizophrenia in non-western cultural settings. Various clinical aspects of schizophrenia have been described to express differently in the Indian sub-continent. In this background, it is important to note that social cognitive deficits are transcultural in nature, i.e. they are present among schizophrenia subjects across different cultures, despite differing cultural influences.[29] So, when these cultural validated tools (SOCRATIS and TRENDS) were administered in a study to assess the social cognitive deficits and their relative independence from neurocognitive deficits in remitted schizophrenia patients with matched healthy controls, then social cognitive and neurocognitive deficits were found among the schizophrenia patients. Deficits in social cognition were largely independent of neurocognitive performance, and social cognition deficits persisted after adjusting for deficits in neurocognitive

function. All patients scored below a defined cut-off in at least one social cognition domain. Hence, it was concluded that social cognitive deficits are likely to be state-independent in schizophrenia, as they are present in remission phase of the illness. Analysis of the effect sizes of social cognitive deficits (especially in ToM and emotion recognition) in schizophrenia reveals a possibility that these deficits are of larger amplitude in the Indian setting when compared to the west. This study also supports the possibility of a composite-endophenotype in schizophrenia.[30]

Hence, researchers concluded that more studies in this area would provide useful insights into the neurobiological basis of neuropsychiatric disorders which could have important implications for improving socio-occupational functioning. Both SOCRATIS and TRENDS have been validated in the Indian cultural setting with satisfactory psychometrics as influences of culture, age, and sex on emotional expression and social perception is well-established.

When scanned through researches, it is found that social cognitive deficits are the key determinants of daily functioning in schizophrenia, including instrumental actions, interpersonal functioning, and vocational achievement.[31] Recent enthusiasm for social cognition in schizophrenia has followed upon research showing that it has a relationship with functional outcomes (e.g. social skills, community functioning).[32,33] It has inspired researchers to examine whether social cognition can be improved,[34] because social cognition may be an important target for pharmacological and psychosocial treatments.

Psychosocial treatment programmes use a variety of techniques to ameliorate social cognitive deficits, from “targeted” interventions that focus on a specific skill (e.g. asking clients to imitate others’ facial expressions to improve emotion perception) to those that target integrative social cognitive abilities via viewing videotapes and role-playing. While there is growing evidence that social cognition can be improved, future research needs to determine whether improvements in social cognition generalise to other social cognitive domains as well as to behaviours. In “Neuroplasticity and outcome in schizophrenia: the role of psychological interventions”, Rajkumar[35] discussed trials which included social cognition and addressed social cognitive skills. Findings from studies suggest that targeting social cognition may result in changes in real-world behaviour,[36] although these findings are preliminary and in need of replication. It might be the case that social cognitive training cannot be done in isolation, but must be linked with broader based skills training in a manner consistent with the most effective cognitive remediation studies.[37] Thus, one can imagine

tailoring treatment (cognitive remediation, social cognitive training, cognitive behavioural therapy, etc.) to the needs of the client with schizophrenia, rather than hoping that a “one size intervention” will fit all; an unrealistic expectation given the heterogeneity of the disorder (and its changes over time). Clearly, however, social cognitive training has promise as an addition to the armamentarium of the treatments for schizophrenia.

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