

## Insight in Schizophrenia: Relationship to Positive, Negative and Neurocognitive Dimensions

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### ABSTRACT

Impairment of insight is considered as the hallmark of schizophrenia. Substantial proportion of patients with schizophrenia has either poor or absent insight. Insight is a multidimensional and dynamic construct which appears to have intricate links with other symptom dimensions of the psychotic illness. A better appreciation of the association that insight shares with other symptom clusters in psychosis could help us in gaining knowledge about aetiology, prognosis and treatment-related facets of the disorder. This is likely to have critical implications in the understanding and therapeutics of schizophrenia.

**Key words:** *Insight, negative symptoms, neurocognition, positive symptoms, schizophrenia*

### INTRODUCTION

Impairment in insight has been considered to be the cardinal feature in psychotic illness.<sup>[1]</sup> In the context of psychiatric illnesses, it is considered to encompass the various dimensions such as ability to recognise that one has psychiatric illness, ability to label unusual psychological experiences as pathological and adherence to the advised treatment.<sup>[2]</sup> It may be equated to the term called “anosognosia” which often refers to the lack of awareness of neurological disturbance.<sup>[3]</sup> Insight has been conceptualised as a multidimensional construct with its elements being understanding the symptomatology and existence of illness, knowledge of illness aetiology, awareness of chances of relapse and value of treatment.<sup>[4]</sup> Impairment or lack of insight is

considered as one of the most central symptoms in schizophrenia and this feature to some extent helps in differentiating schizophrenia from other overlapping psychiatric disorders.<sup>[5]</sup> According to the International Pilot Study on Schizophrenia (IPSS), a substantial proportion of patients with schizophrenia (up to 80%) demonstrate poor insight into the illness, irrespective of the cultural variation of patients. Diminished insight is associated with poor treatment adherence<sup>[6]</sup> and has been linked to a greater risk for relapse of symptoms.<sup>[7]</sup> In addition, poor insight can potentially worsen the social and interpersonal malfunction which is observed in schizophrenia.<sup>[8]</sup> Poor insight has been linked to poor outcome of psychosis in multiple ways. The negative influence of poor insight has been demonstrated in relation to quality of life, rehospitalisation, poor treatment adherence and poor outcome of psychosis.<sup>[9]</sup>

Insight can be broadly classified into clinical and cognitive.<sup>[10]</sup> The former is a simpler definition which empowers the clinician to understand whether a patient is aware of the symptoms. The latter refers to a higher and complex concept of metacognition, which deals with one’s ability to examine distorted cognitive views and revise them. Insight can be assessed during the

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mental status examination using questions which aim to elicit awareness of symptoms, attribution of symptoms by the patient and readiness to accept medications/treatment. However, clinical insight can be assessed more formally through instruments such as Schedule for Assessment of Insight — extended (SAI-E)<sup>[2]</sup> and Scale for Assessment of Unawareness of Mental Disorder (SUMD).<sup>[11]</sup> On the other hand, Beck Cognitive Insight Scale (BCIS), which has been widely used in studies, examines cognitive processes involved in evaluation of anomalous experiences.<sup>[12]</sup>

Insight has often been considered as an elusive target despite its conspicuous impairment in schizophrenia.<sup>[13]</sup> It is now being increasingly recognised that insight might not be a dichotomous entity; rather it is a dynamic and dimensional construct.<sup>[2,14]</sup> There is a much broader social understanding of this construct which describes that there is relative disagreement regarding reality between the patients, family members and treatment providers.<sup>[15]</sup> Some of the Indian studies have examined the role of cultural factors in insight and have highlighted the importance of the need to understand the variations in exploratory models in the cultural context while assessing insight.<sup>[16-18]</sup>

This broader understanding might be the key in addressing the issue of adherence to treatment. However, a biological understanding of insight attempts to examine the substrate for this construct and its relationship to various other symptom dimensions of schizophrenia, thus conferring a pathological significance for this entity.<sup>[19,20]</sup>

## INSIGHT AND ITS RELATIONSHIP WITH SYMPTOM DIMENSIONS IN SCHIZOPHRENIA

Schizophrenia is a multidimensional disorder and the symptoms are heterogeneous.<sup>[21]</sup> The most researched symptom dimensions in schizophrenia are positive, negative and cognitive dimensions. Some of the previous studies have demonstrated relationship of insight with positive symptoms,<sup>[22-27]</sup> negative symptoms,<sup>[22,25-33]</sup> and neurocognitive impairment<sup>[34]</sup> among patients with schizophrenia.

A better appreciation of the association which insight shares with other symptom clusters in psychosis could help us in gaining knowledge about aetiology, prognosis and treatment-related facets of the disorder. The relationship of insight with positive symptoms, negative symptoms and cognitive symptoms in schizophrenia is discussed subsequently. The previous reviews on insight have focused on the broader constructs

and factors related to insight,<sup>[10,15]</sup> while we have attempted to provide a descriptive critical overview of relationship between insight and major symptom dimensions in schizophrenia. We used the search terms “delusions”, “hallucinations”, “disorganisation”, “formal thought disorder”, “cognitive”, and “neurocognitive”, “neuropsychological”, “positive symptoms”, “negative symptoms” along with “insight ”and“ schizophrenia” or “psychosis”.

## INSIGHT AND POSITIVE SYMPTOMS

Van Putten *et al.* described that patients with schizophrenia have a “delusion of health”, resist taking medications and thus “wish” to remain unwell.<sup>[35]</sup> Such an explanation would indicate that insight is inherently a positive psychotic symptom. Even though this view is old and not well tested, some studies have shown association between insight and positive symptoms. A meta-analysis by Mintz *et al.* demonstrated that during acute episode of psychosis, the relationship found between insight and positive symptoms were stronger<sup>[36]</sup>, depicting a modest negative relationship through mean effect sizes across studies ranging from -0.16 to -0.33. However, Lincoln *et al.* failed to demonstrate such an association and the authors concluded that it is difficult to draw meaningful inferences due to variability in study methods across studies.<sup>[37]</sup>

Amador *et al.* reported that insight correlated strongly with positive symptoms such as delusions and disorganisation symptoms.<sup>[38]</sup> Nieto *et al.* demonstrated that insight had a significant association with positive symptoms and general symptoms but not with negative symptoms in a sample of 96 acutely ill psychotic patients.<sup>[39]</sup> Furthermore, poor insight has been recently reported to be linked to greater positive symptoms and violence.<sup>[40]</sup> Positive symptom score correlated significantly with insight among never-medicated patients as well as chronic medicated schizophrenia patients in a sample from Chennai.<sup>[41]</sup> According to a study by Kim *et al.*, positive symptoms, primarily, delusions, hallucinations and disordered thought demonstrated a significant negative correlation with insight.<sup>[42]</sup> In an attempt to examine the association of insight with symptom dimensions in schizophrenia, Buchy *et al.* observed that delusions and psychomotor excitement were associated with poor insight.<sup>[43]</sup> Pedrelli *et al.* reported a mild correlation between symptomatology including positive symptoms and insight using BCIS.<sup>[44]</sup> A strong relationship between active delusions was demonstrated in a relatively small sample of patients by Warman *et al.*<sup>[11]</sup> The occurrence of delusion was associated with low self-reflectiveness factor of BCIS.<sup>[45]</sup>

Overall, there appears to be an association between insight and “positive” psychopathology in schizophrenia. However, the strength of association appears to be at the most modest with a moderate effect size as evidenced by one meta-analysis<sup>[36]</sup> while the recent meta-analysis fails to demonstrate any association.<sup>[37]</sup> Even though insight could have a significant relationship with positive symptoms, this association does not appear to be exclusive to all the stages of the illness. Wiffen *et al.* reported that even though insight was strongly related to positive symptoms, it also has “trait” features showing its deficits during the remitted phase of illness.<sup>[46]</sup> Impairments of insight seen in remission phase of schizophrenia at 1 year follow-up as demonstrated by Ceskova *et al.* highlight that positive symptoms might not be a strong association with poor insight.<sup>[47]</sup>

In summary, while it is conceivable that the “loss of touch with reality” concept relates to positive symptoms to insight, according to Mintz *et al.* only 3-7% of the variance in the degree of insight was due to the severity of symptoms.<sup>[36]</sup> In addition, it was also demonstrated in the above study that the relationship between insight and positive symptoms was greater during acute episodes of psychosis compared to periods of remission highlighting the moderating influence of other symptom dimensions on insight.

## INSIGHT AND NEGATIVE SYMPTOMS

Negative symptoms form an important dimension of schizophrenia and they are constituted by blunting of affect/emotions, reduced speech output, lack of motivation, poor socialisation and reduced attention.<sup>[48]</sup> They are considered to be among the “core symptoms” of the illness with a significant relationship to the pathology.<sup>[49]</sup> In addition, persistent negative symptoms can impair the quality of life and are associated with a poor prognosis in patients with schizophrenia.<sup>[50]</sup> The treatment options for negative symptoms are limited and are less satisfactory compared to those for positive symptoms.<sup>[51]</sup> Thus, negative symptoms represent an unmet therapeutic requirement.

Negative symptoms in schizophrenia have been linked convincingly to frontal lobe dysfunction and “hypofrontality” has been considered to be an important biological basis of these symptoms.<sup>[52]</sup> In this context, insight also has been paralleled with fronto-parietal dysfunction and a neurological concept of “anosognosia” has been applied to explain lack of insight in schizophrenia.<sup>[3]</sup> One of the theories explains that poor insight is an inability to understand one’s own psychological experiences, resulting in psychological withdrawal. Using this theory, lack of insight has been

explained as a negative symptom.<sup>[15]</sup> Various studies have attempted to study the relationship between insight and negative symptoms. In a study by Tirupathi *et al.*, poor insight demonstrated significant correlation with negative symptoms among treated patients and the authors discuss about a possible subgroup of patients who have negative symptoms and poor insight compositely related to treatment resistance.<sup>[41]</sup> Patients with prominent negative symptoms and lack of insight constituted a group with significant impairments in neurocognitive measures such as attention, executive functioning and psychomotor performance according to another study.<sup>[53]</sup> Lack of insight showed a modest association with negative symptoms in addition to positive symptoms and neurocognitive measures in chronically ill patients with psychosis.<sup>[54]</sup> Similarly, Debowska *et al.* reported that insight had a significant relationship to negative symptoms and other psychopathology.<sup>[55]</sup> Similar intricate relationship between poor insight and negative symptoms has been highlighted in first episode psychosis cohorts also.<sup>[56]</sup> In the meta-analysis by Mintz *et al.*, a small negative relationship between insight and negative symptoms was demonstrated.<sup>[36]</sup>

In a study by Kemp *et al.*, it was reported that in subjects who improved with treatment, insight had a specific correlation with negative symptoms.<sup>[57]</sup> Similarly, improvement in insight with long acting risperidone and its relationship with negative symptoms was demonstrated in another study.<sup>[58]</sup> Poor insight and symptoms including the negative dimension of illness in schizophrenia predicted poor therapeutic alliance of psychotherapy.<sup>[59]</sup> In addition, the relationship between lack of insight and negative symptoms could explain poor treatment adherence among patients with schizophrenia.<sup>[60,61]</sup>

In summary, negative symptoms have been consistently associated with insight in many studies even though negative studies exist in the literature. This association has also been related to the classical “hypofrontality” theory of schizophrenia, thus depicting poor insight as a negative symptom dimension. Conceptually, greater severity of negative symptoms could result in difficulty in distinguishing own subjectivity with respect to the surrounding reality and to recognise a disorder as belonging to his/her own person.<sup>[62]</sup> In addition, patients with marked negative symptoms such as apathy and social withdrawal have significant difficulty in maintaining therapeutic relationship and in adhering to the prescribed treatment plan. This relationship might explain persistent abnormalities in insight even after symptomatic improvement in symptoms since “improvement” is mostly referred to regarding the positive dimension.

## INSIGHT AND NEUROCOGNITIVE MEASURES

Metacognition in the context of insight is a concept which refers to the deployment of semi-independent neurocognitive functions simultaneously which enables a person to understand of himself or herself as experiencing an illness. The cognitive process that might form the basis of insight in psychosis is self-reflection and the conscious evaluation of own characteristics.<sup>[63]</sup> Thus, insight as a construct, theoretically requires a wide range of inputs from various neurocognitive functions predominantly, frontal and parietal.<sup>[20,64,65]</sup> It is well-known that patients with schizophrenia demonstrate deficits in various neurocognitive measures, predominantly prefrontal cortical and parietal measures, even though there is a great heterogeneity in this aspect.<sup>[66]</sup> It has also been suggested that diminished functioning of the prefrontal cortex, which is a substrate for mental flexibility, mental abstract reasoning and self-reflection, could lead to impairment in insight.<sup>[2]</sup> Neurocognitive measures form a component of many intricately linked variables that might be responsible for poor insight in schizophrenia patients.<sup>[62]</sup> Various studies report that unawareness of illness in psychosis is associated with impairment on many neuropsychological domains.<sup>[67]</sup> However, certain consistent findings are mentioned below.

Ritsner and Blumenkrantz in their study attributed poor insight to impairment in executive functions, visuo-spatial skills and sustained attention.<sup>[25]</sup> Studies have shown that attention deficits could be a cause for the inability to define the psychotic phenomena and the associated inability to attribute the psychotic experiences towards mental illness in the patient.<sup>[68]</sup> Of the various domains, executive function and working memory impairment has been found to have an imperatively significant association with lack of insight.<sup>[69,70]</sup> Mohamed *et al* reported that the unawareness of symptoms are significantly associated with deficits in some aspects of executive functioning.<sup>[71]</sup> Subjects with poor insight were found to have greater perseverative errors and executive dysfunction in addition to the presence of neuroanatomical changes in the prefrontal cortical regions.<sup>[72]</sup> Poor insight was linked to poor working memory and such an association was demonstrated even in first episode schizophrenia.<sup>[56]</sup> However, Monteiro *et al.* observed that insight could be associated with neurocognitive dysfunction and they argued that this association is mediated by the “disorganization factor” in the schizophrenia psychopathology.<sup>[30]</sup> In a meta-analysis, Aleman *et al.*

concluded that neuropsychological impairments, especially those of set-shifting and error monitoring, contributed to poor insight in schizophrenia.<sup>[34]</sup>

There is emerging body of evidence which examines the role of social cognitive deficits and insight into the symptoms in psychosis. Recently, it has been reported that the effect of theory of mind (ToM) deficits among subjects with psychosis remain significant despite controlling for other neurocognitive measures and symptomatology scores.<sup>[73]</sup> Similar association between social cognitive deficits and impaired insight have been observed by various others.<sup>[74,75]</sup> Keshavan *et al.* demonstrated that insight might not be restricted to a few prefrontal cognitive domains; rather it is associated with a broad range of psychopathology and cognitive measures.<sup>[76]</sup> Buchy *et al.* observed a significant correlation between Beck’s Cognitive Insight Scale composite index and verbal learning/memory in first episode schizophrenia in addition to demonstrating its substrate in the hippocampus.<sup>[77]</sup> Changes in insight over longitudinal course at the end of 3 years was studied by Quee *et al*, who reported that better neuropsychological performance and lesser clinical symptoms at the baseline predicted improvement in insight.<sup>[78]</sup>

## CONCLUSIONS

Insight appears to a vital dynamic construct which has prominent associations with various other symptom dimensions in schizophrenia. Even though insight has been explained variously by authors relating it to positive, negative and cognitive symptoms, it appears that only a composite and amalgamated concept would explain it thoroughly. This explanation is likely to have critical implications in the understanding and therapeutics of schizophrenia. These are a few findings which are consistently demonstrated regarding insight in psychotic illness:

- a) Insight is impaired in patients with schizophrenia and this is almost a defining feature.
- b) Neurocognitive impairments, principally related to prefrontal cortical and parietal functioning appears to be a close association to impaired insight.
- c) Even though many studies demonstrate the association of insight with positive and negative symptoms, many studies refute this association. The association if present appears to be modest, as revealed by the meta-analyses on this topic<sup>[36,37]</sup>.
- d) Finally, insight appears to deliver a predictive value on the course and treatment response in schizophrenia.<sup>[9]</sup>

The final aspect has important implications in planning treatment and service delivery for patients



with schizophrenia. The question pertaining to the understanding the relationship of insight to various symptom dimensions in schizophrenia begs longitudinal studies which incorporate various aspects of insight together with systematic assessment of various psychopathological domains.

As suggested previously by Boyer *et al*, the association among neurocognition, insight and treatment non-adherence should be considered to develop more efficacious strategies to enhance treatment adherence.<sup>[64]</sup> Apart from psychoeducating the families, interventions which focus on the improvement in insight and amelioration of cognitive impairments is essential. Recent models of treatment, targeting metacognitive deficits in psychosis might provide greater “insights” into therapy aiming at changing “insight” in schizophrenia, thus improving the adherence to treatment.<sup>[64,79]</sup> Since insight is a factor which needs explanations based on cultural aspects<sup>[18]</sup>, it is imperative to develop culturally validated and acceptable forms of treatment for better results.

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