Self-awareness of cognitive functioning in schizophrenia: Patients and their relatives

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Accepted 26 December 2011

ARTICLE INFO

Article history:
Received 26 July 2010
Received in revised form 18 November 2011
Accepted 26 December 2011

Keywords:
Clinical psychiatry
Cognition
Insight
Family

ABSTRACT

Cognitive impairment has been recognized since the earliest descriptions of schizophrenia as a core feature of the illness and different programmes have been developed to remediate these deficits. In all likelihood it is important for compliance and adherence to treatment that not only the patients but also their relatives be aware of the patients; cognitive deficits. Sixty-two patients with a diagnosis of schizophrenia and, for each one of them, one family member and an informant from the medical staff, were recruited and administered the Schizophrenia Cognition Rating Scale (SCoSRS) ratings. Patients were tested for cognitive deficits with a neuropsychological battery and their performance was compared to the ratings of cognitive functioning provided by the patient himself, his family member and the informant. Results show no significant association between cognitive performance and SCoRS ratings in patients; only for executive functions the patient’s performance was found to be predictive of the respective judgment on the SCoRS that was given by the relative. This is the first study to investigate awareness of the patients’ cognitive deficits, both in the patients themselves and in their first degree relatives, through a direct comparison between subjective clinical ratings and objective measures of cognitive performances. When both patients and relatives are unaware of the patients’ cognitive deficits, this could affect adherence to remediation treatment and need to be specifically addressed in future rehabilitation strategies.

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1. Introduction

Cognitive impairment has been recognized since the earliest descriptions of schizophrenia as a core feature of the illness. Recently, cognitive impairment has also been considered a major contributor to poor functional outcome (Green, 1993; Niendam et al., 2006). Although the extent of performance deficits may vary across tests and within groups of subjects (Ermoli et al., 2005), most patients show impairments in multiple domains of cognitive functioning including memory, attention, executive function, language and psychomotor coordination (Keefe et al., 2004). These findings have led to an increasing interest in experimental approaches based on cognitive interventions aimed at the rehabilitation of cognitive deficits in patients with schizophrenia. Following this interest many different cognitive remediation programmes have been developed (Kurtz et al., 2007), with the assumption that reducing these deficits would provide benefits to the functioning of patients (Wykes et al., 1999). These interventions are more likely to be effective if patients understand the limitation of their cognitive functioning, the influence it exerts on daily functioning, and the consequent need to improve their cognitive skills.

The lack of insight into illness is one of the characteristic features of schizophrenia and it is widely acknowledged that it has a notable influence on cooperation with treatment and clinical outcome (Smith et al., 1999; Kamali et al., 2001). Indeed awareness of need for treatment is predictive of compliance with treatment, prognosis, social and occupational functioning, and better outcome in schizophrenia (Schwartz et al., 1997; Schwartz, 1998; Young et al., 2003). So far, no research has studied the relationship between insight into cognitive symptoms and adherence to cognitive remediation treatment in schizophrenia, but among people with Traumatic Brain Injury (TBI) adherence to the rehabilitation treatment is positively correlated with the awareness of cognitive disabilities (Trahan et al., 2006).

To date, the majority of studies about insight in schizophrenia have focused on psychotic symptoms. Typically insight refers to lack of awareness and cognitive understanding of symptoms such as hallucinations, delusions and paranoia (McEvoy et al., 1989; Amador et al., 1993; Cuesta et al., 2000; Young et al., 2003; Beck et al., 2004). Research demonstrates that awareness into psychotic symptoms is generally poor; however, the relationship between clinical insight and symptomatology is complex, with some studies finding correlations (Amador et al., 1993; Carroll et al., 1999; Smith et al., 1999); (Kemp and Lambert, 1995; Collins et al., 1997) and other studies finding no associations (Cuesta and Peralta, 1994; Lysaker and Bell, 1994; Peralta and Cuesta, 1994) between psychosis and clinical insight.
With the growing interest in providing treatment for cognitive deficits in schizophrenia, it becomes important to understand if patients are aware of having cognitive problems, that is, if they have insight into their cognitive deficits. Only recently have researchers begun to question whether people with schizophrenia show insight into the cognitive symptoms (as rated by clinicians) and neuropsychological deficits (as measured by performance based tests) of their illness, with most of the evidence suggesting that psychiatric patients lack awareness into cognitive deficits. A very recent study reports that patients had significantly less insight into their neurocognitive symptoms compared to their clinical symptoms (Medalia and Thysen, 2010). In another study self-report of attention dysfunction was not related to objective deficits in the Continuous Performance Task in 21 people with schizophrenia and 16 depressed patients (van den Bosch and Rombouts, 1998). Moritz et al. (Moritz et al., 2004) examined 148 psychiatric inpatients with schizophrenia, depression, and anxiety disorders, using a self-report questionnaire focusing on cognitive skills needed in daily life, and found no correspondence between patients’ neurocognitive performance and their self-evaluation. Keefe et al. (Keefe et al., 2006) found that neuropsychological functioning as measured by objective tests (Brief Assessment of Cognition in Schizophrenia) did not correlate with patients’ report of cognitive dysfunction but found a correlation with ratings obtained from clinical informants and interviewers, all measured with the Schizophrenia Cognition Rating Scale (SCoRS; Medalia and Lim, 2004), using the Work-Readiness Cognitive Screen, a web-based cognitive screening tool, found that over half of the participants were classified as impaired in memory and attention, yet 40% of these same patients did not perceive that they had any cognitive difficulty. In another study Medalia and Thysen (Medalia and Thysen, 2008) found no significant association between degree of impairment on neuropsychological tests and patients’ report of cognitive dysfunction. Finally one article suggests that patients are sometimes able to recognize when they have cognitive difficulties. Stip et al. (Stip et al., 2003) administered the Subjective Scale to Investigate Cognition in Schizophrenia (SSSTICS), a 21-item, self-report Likert type scale that asks patients to rate the frequency with which they may experience problems in concentration and memory, to 114 individuals with schizophrenia, schizophreniform disorder, or schizoaffective disorder. They found modest but significant correlations between patients’ ratings on the frequency of problems and the degree of neuropsychological impairment evidenced by objective tests.

Results of recent research lead to a growing awareness that insight is not only a matter of patient’s self-perception but an experience of illness guided by the sociocultural context. As families are an important component of the patient’s life and their support is essential in the compliance to treatment, it is important to investigate if families of patients with schizophrenia are aware of their relative’s showing a cognitive impairment. Families frequently show a wrong reaction to their relative’s schizophrenia-associated symptoms. This reaction is possibly rooted in how the family interprets these symptoms; indeed families often report the most distressing symptoms exhibited by their ill relative to be related to negative symptomatology - such as lack of energy, lack of purposeful activity, and a generalized unresponsiveness (Bibou-Nakou et al., 1997; Weisman et al., 1998; Hinrichsen and Lieberman, 1999) - and blame the patient for these behaviors, unaware that they are characteristic symptoms of schizophrenia (Hooley and Campbell, 2002).

This lack of insight has a strongly negative influence on the effectviness of psychosocial intervention. As far as we know, no study has been performed to investigate family members’ awareness of their ill relative’s deficits. Only one study has evaluated the insight of psychotic patients into their own cognitive impair-ment (basic deficits and social functioning) as compared to caregivers’ perception (Sanjuan et al., 2006): clear differences were observed in estimating social abilities, with patients being less aware of their cognitive deficits; only memory presented significant differences, among cognitive functions were not. Unfortunately, in this study, cognitive functions haven’t objectively evaluated and no objective neuropsychological test was used.

The aim of the present study is to replicate previous findings about patients’ lack of insight into cognitive deficits and to investigate if families of patients with schizophrenia are aware of the cognitive impairment of their affected relative. We decided to use a tool originally created to identify cognitive symptoms which has a good correlation with performance and enables us to compare the perception of cognitive functioning in patients, relatives and a clinical informant with objective neuropsychological outcomes, thus giving us a measure of insight.

2. Materials and methods

2.1. Study design

2.1.1. Subjects

Sixty-two patients (37 males and 25 females) affected by chronic schizophrenia, undifferentiated subtype [DSM-IV criteria, Structured Clinical Interview for DSM-IV (SCID-I) interview], Positive and Negative Syndrome Scale (Kay and Opler, 1987) total score 75.93 (S.D. = 19.71) [positive symptoms 17.19 (S.D. = 5.99), and negative symptoms 22.63 (S.D. = 7.24)] were studied. All patients were on antipsychotic monotherapy: 26 were on clozapine; 3 on haloperidol; 26 on risperidone; 3 on aripiprazole and 4 on olanzapine. Subjects were recruited in the Day-Hospital and Centro Diurno of San Raffaele Hospital in Milan, Italy.

To be included in the study, patients had to show no evidence of substance dependence or abuse, co-morbid diagnosis on Axis I and II, epilepsy or any other major neurological illness, perinatal trauma, or mental retardation. Demographic and performance data are listed in Table 1.

In addition to patients, 62 first degree unaffected relatives (39 mothers, 18 fathers and 5 siblings) and 62 informants were included in the study. Informants were professionals from the medical team following the patient who had a good knowledge of the subject.

2.2. Assessment

2.2.1. Neuropsychological assessment

The Italian version (Anselmetti et al., 2008) of the Brief Assessment of Cognition in Schizophrenia (BACS; Keefe et al., 2004) was administered to all subjects. This is a battery of neuropsychological tests requiring brief time of complete administration; the entire battery lasts approximately 30 minutes and consists of the following tests: verbal memory (patients are presented with 15 words and then asked to recall as many as possible), working memory (patients are verbally presented with clusters of numbers and asked to tell the experimenter the numbers in order, from lowest to highest), token motor task (patients are given 100 plastic tokens and asked to place them into a container as quickly as possible in 60 seconds), attention (patients receive a key explaining how unique symbols correspond to numbers 1–9 and they are asked to place the corresponding number beneath a given series of symbols as quickly as possible), semantic fluency (patients are given 60 seconds to name as many words as possible within a given category), letter fluency (in two separate trials, patients are given 60 seconds to generate as many words as possible beginning with a given letter), executive function (Tower of London; patients are presented with two pictures showing three colored balls arranged on three different pegs. They are asked to tell the minimum number of moves needed to match the arrangement of the first picture with the second one). Verbal memory and letter fluency tasks were adapted to Italian language by substituting words with translated Italian vocabulary words matched for frequency and phonemic characteristics, and letters with letters already used in Italian common clinical tests for letter fluency. Test–retest reliability was measured with intra-class correlations (ICC) that were equal to or greater than 0.79. Performance data are listed in Table 1.

2.2.2. Insight assessment

The Schizophrenia Cognition Rating Scale (SCoRS; Keefe et al., 2006), a measure designed to detect cognitive changes in clinical trials, was used to assess awareness

<table>
<thead>
<tr>
<th>Table 1</th>
<th>Demographic data and performance on the BACS. For BACS performance, the number of patients shown refers to poor performers.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients</td>
<td>Number</td>
</tr>
<tr>
<td>Age</td>
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</tr>
<tr>
<td>Onset</td>
<td>62</td>
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<tr>
<td>Education</td>
<td>62</td>
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<tr>
<td>Performances - BACS performance</td>
<td></td>
</tr>
<tr>
<td>Memory</td>
<td>33</td>
</tr>
<tr>
<td>Attention–symbol coding</td>
<td>42</td>
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<tr>
<td>Executive functions–Tower of London</td>
<td>37</td>
</tr>
<tr>
<td>Psychomotor coordination</td>
<td>41</td>
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</table>
into cognitive deficits. Multiple reasons led us to choose the SCoRS as a measure of insight: firstly, other interviews assessing cognition in schizophrenic patients have been shown to have no or small significant correlations with performance (Keefe et al., 2006); secondly, it assesses the cognitive domains of attention, memory, reasoning and problem solving, working memory, language production, and motor skills. These areas were chosen because of the severity of impairment of these domains in many patients with schizophrenia and the demonstrated relationship of these areas of cognitive deficit with impairments in aspects of functional outcome (Green, 1996; Green et al., 2000). Two examples of items from the SCoRS are: “Do you have difficulty remembering names of people you know?” and “Do you have difficulty following a TV show?” Each item is rated on a 4-point scale. Higher ratings reflect a greater degree of impairment. It is possible to make a rating of “n/a” for “not applicable” (e.g., if the patient is illiterate, items related to reading are rated as “n/a”). Each item has anchor points for all levels of the 4-point scale. The anchor points for each item focus on the degree of impairment and the degree to which the deficit impairs day-to-day functioning (Keefe et al., 2006).

In the study of Keefe et al. (2006), the SCoRS showed strong internal consistency (Cronbach’s alpha coefficient, 0.79) and strong inter-rater reliability: thirteen of the 18 items had an intraclass correlation coefficient (ICC) of 1.00, indicating absolute agreement between the two interviewers for all 11 patients. The ICs for four of the other five items were greater than 0.90, and the lowest ICC for an item (“Do you have difficulty walking as fast you would like?”) was 0.81. (Keefe et al., 2006).

In this study complete administration of the SCoRS generated three independent different ratings collected by means of an interview with the patient, an interview with a relative and a rating by an informant from the medical staff treating the patient. Informal time estimates suggest that each interview required an average of about 12 minutes of interview time and 1 or 2 minutes of scoring time. All evaluations were made in the same day, by a trained psychologist blind to the aim of the study. The SCoRS was administered to patients, respective relative and informant by the same psychologist on the same day, by a trained psychologist blind to the aim of the study. The SCoRS is an 18-item interview-based assessment of cognitive deficits and the degree to which they affect day-to-day functioning.

The items were developed by Keefe to assess the cognitive domains of attention, memory, reasoning and problem solving, working memory, language production, and motor skills. These areas were chosen because of the severity of impairment of these domains in many patients with schizophrenia and the demonstrated relationship of these areas of cognitive deficit with impairments in aspects of functional outcome (Green, 1996; Green et al., 2000). Two examples of items from the SCoRS are: “Do you have difficulty remembering names of people you know?” and “Do you have difficulty following a TV show?” Each item is rated on a 4-point scale. Higher ratings reflect a greater degree of impairment. It is possible to make a rating of “n/a” for “not applicable” (e.g., if the patient is illiterate, items related to reading are rated as “n/a”). Each item has anchor points for all levels of the 4-point scale. The anchor points for each item focus on the degree of impairment and the degree to which the deficit impairs day-to-day functioning (Keefe et al., 2006).

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2.3. Statistical analysis

Only the poor performers were included in the analysis in order to investigate the awareness of cognitive deficits. Scores on the BACS and number of patients included in each analysis are listed in Table 1. Normative Italian adjusted scores were used to discriminates between good performers and poor performers on the BACS test (Anselmetti et al., 2008). Patients reaching equivalent scores 2, 3 or 4 were considered as good performers while patients scoring 0 or 1 were considered as poor performers.

The following areas have been taken into account in the analysis: memory, attention, executive functions and psychomotor coordination. Results have been evaluated with two different analysis. First, data were analyzed through an analysis of variance (ANOVA) with SCoRS ratings as dependent variable and goodness of performance as grouping variable. Different analysis focused on the awareness of cognitive deficits, finding the same lack of insight previously shown for insight into illness (Stip et al., 2003; Medalia and Lim, 2004; Medalia and Thysen, 2008). So far no study has been performed to investigate if the families of this type of patient are aware of their relative’s cognitive deficits. Moreover, this is the first study to use the SCoRS as a measure of insight; this scale was previously used as a tool to identify cognitive symptoms, but no previous study used it as a tool to assess insight.

The insight into cognitive deficits in patients and their relatives was compared with the evaluation made by someone who was part of the medical team treating the patient. While the medical personnel corrected detected all the deficits, the results for the patients show an underestimation of cognitive deficits, confirming a lack of insight not only into illness but also into cognitive deficits. One hypothesis could be that the lack of awareness of cognitive deficits could be part of a more general difficulty concerning awareness of self and one’s own abilities. The families seem not only unable to have insight into the illness of their affected members but also have great difficulties in recognizing the presence of cognitive deficits; indeed, a relationship between performance and relatives’ evaluation has been shown only for executive functions. While deficits in executive functions are the easiest to recognize (i.e. difficulties in cooking, using technologies, planning activities), a possible explanation for families’ unawareness of the other deficits could be a problem of attribution as they often attribute symptoms and deficits to their ill relative’s personality and perceived character flaws, lack of interest or motivation instead of understanding that these are consequences of the illness (Brady and McCain, 2005). Even if it goes beyond the purpose of this study, our findings raise the question of the reliability of clinical rat-ings of cognitive symptoms and its relationship with performance-based neuropsychological testing, as their overlapping variance has been found to be quite small (Vadhan et al., 2001; Harvey et al., 2001). With respect to SCoRS and in contrast with previous studies which did not find a strong relation between cognitive performance and ratings of symptoms, Keefe et al. (2006) found that SCoRS interviewer (here informant) ratings were strongly correlated with cognitive performance as measured by the BACS, more so than with real-

### Table 3

<table>
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<tr>
<th>Tablenumber</th>
<th>Relationship between SCoRS scores and cognitive performance as measured by BACS.</th>
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<td>F</td>
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<tr>
<td>Memory</td>
<td>1/21</td>
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<tr>
<td>Attention-symbol coding</td>
<td>1/42</td>
</tr>
<tr>
<td>Executive functions-Tower of London</td>
<td>1/37</td>
</tr>
<tr>
<td>Psychomotor coordination</td>
<td>1/41</td>
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</table>

### 4. Discussion

This is the first study to investigate awareness of the patient’s cognitive deficits, both in patients and first degree relatives, through a direct comparison between subjective and objective measures of cognitive functioning. To date, different studies in the literature have investigated the insight into illness of patients with schizophrenia and only a few have focused on families, finding similar difficulties in identifying symptoms as resulting from pathology. Only recently research focused on the awareness of cognitive deficits, finding the same lack of insight previously shown for insight into illness (Stip et al., 2003; Medalia and Lim, 2004; Medalia and Thysen, 2008). So far no study has been performed to investigate if the families of this type of patient are aware of their relative’s cognitive deficits. Moreover, this is the first study to use the SCoRS as a measure of insight; this scale was previously used as a tool to identify cognitive symptoms, but no previous study used it as a tool to assess insight.

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### Table 2

<table>
<thead>
<tr>
<th>SCoRS</th>
<th>Patient</th>
<th>Relative</th>
<th>Informant</th>
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<tr>
<td>Mean ± S.D.</td>
<td>Mean ± S.D.</td>
<td>Mean ± S.D.</td>
<td></td>
</tr>
<tr>
<td>Memory</td>
<td>10.72 ± 2.98</td>
<td>8.43 ± 3.05</td>
<td>15.22 ± 3.93</td>
</tr>
<tr>
<td>Attention-symbol coding</td>
<td>9.56 ± 2.99</td>
<td>6.64 ± 2.80</td>
<td>14.93 ± 3.60</td>
</tr>
<tr>
<td>Executive functions-Tower of London</td>
<td>7.97 ± 2.70</td>
<td>10.09 ± 3.74</td>
<td>13.81 ± 2.82</td>
</tr>
<tr>
<td>Psychomotor coordination</td>
<td>3.42 ± 1.28</td>
<td>1.95 ± 0.94</td>
<td>5.05 ± 1.41</td>
</tr>
</tbody>
</table>
world functioning. Coherently, in our sample, all BACS performances are predictive of informant ratings on the SCORS, indicating that the latter represent at least an approximate estimate of cognitive impairment and a useful indication for neuropsychological assessment. Further investigations are needed to measure the amount of variance in BACS performances which SCORS ratings account for. Moreover, this study highlights a limitation of the SCORS, and indicates that this measure should not be used in isolation to assess the presence/absence of cognitive deficits but always in association with a cognitive battery.

Despite the lack of evidence of a direct relation between insight into one’s own cognitive symptoms and poor functional outcome, several studies have reported that when patients with chronic schizophrenia have good insight into symptoms, this has a positive impact on adherence to drug therapy (Bartko et al., 1988; Kemp and David, 1996; Smith et al., 1997; Cabeza et al., 2000). It has also been demonstrated that cognitive appraisal of the disorder, including that of key caregivers, may be related to consequent help-seeking behaviors in mental disease (Yang et al., 1999). If this relationship also pertains to adherence for cognitive enhancing therapies, the finding that patients had no insight into their cognitive symptoms is of some concern. Poor insight into cognitive symptoms could be a main problem for adherence to the new cognition-targeted treatments that are in development. Many patients, by virtue of not perceiving a need for treatment, may not be motivated to participate in cognitive enhancement programs, since they may not fully appreciate the relevance of improving cognitive performances; moreover, a lack of understanding of the reasons for some behaviors could create conflicts within the family. This suggests that there are many patients and families who would benefit from psycho-education about the impact of schizophrenia on cognition. Some psycho-educational material in forms families about these aspects (Medalia and Revbeim, 2002), but more specific interventions for patients and relatives may increase their understanding about neuropsychological abilities and subsequent motivation for treatment. In this regard, a recent study suggests a very interesting intervention program called Family-Directed Cognitive Adaptation (FCA); this program is designed to teach clients and families about neurocognitive problems or weaknesses associated with schizophrenia to (a) develop compensatory strategies for minimizing the impact of these problems on functioning and (b) teach families how to implement and troubleshoot adaptive cognitive strategies (Friedman-Yakoobian et al., 2009). Further studies are needed to (1) deepen our knowledge on the relationship between parents’ or family members’ insight into cognitive deficits and treatment adherence; (2) investigate if patients’ insight into cognitive impairment could improve with cognitive remediation programs and the associated improvement of their cognitive functioning; and (3) investigate if an intervention with the relatives could improve patients’ adherence to cognitive remediation programs and the associated improvement of their cognitive functioning and symptom clusters in chronic schizophrenia. Schizophrenia Research 27 (1), 37–44.


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