Evaluation of the association between insight and symptoms in a large sample of patients with schizophrenia

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Original article

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Abstract

Background: The objective of the present study was to examine the association of insight into the illness with demographic variables and symptomatology in a sample of 1213 patients with schizophrenia.

Method: Data were collected with the Psychosis Evaluation tool for Common use by Caregivers (PECC), a semi-structured interview evaluating five symptom domains of schizophrenia and the insight items ‘awareness of having a mental disorder’ and ‘attributing symptoms to a mental disorder’.

Results: Insight was positively associated with educational level and inversely with overall symptom severity, and the positive, negative, excitatory and cognitive symptom domains. At symptom level, the items ‘delusions’, ‘grandiosity’, ‘poor rapport’, ‘social withdrawal’ and ‘guilt feelings’ showed the strongest associations with both insight items. Overall, correlations between insight and symptomatology were modest, explaining less than 30% of the variance in insight.

Conclusion: Lack of insight in schizophrenia is partially explained by clinical symptoms and demographic measures.

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1. Introduction

Poor insight into the illness is considered to be one of the most common features of schizophrenia [3,7]. Poor insight has a strong impact on clinical outcome [2,39], treatment compliance [6,22,39], social function [27] and rehabilitation outcomes [26]. The body of literature on the aetiology of poor insight in patients with schizophrenia suggests three main models, specifically [1], a clinical model taking poor insight as a primary symptom of the disease [2], a neuropsychological model with poor insight arising as a secondary deficit in neurocognition due to structural and/or functional brain deficits and [3] a psychological model explaining poor insight as a defensive coping strategy [9]. Irrespective of the model applied, however, there is consensus that insight in schizophrenia is a multidimensional construct [1,33]. Its most commonly applied dimensions: awareness of suffering from a mental illness, awareness of specific signs and symptoms of the disorder, the attribution of symptoms to the mental illness, awareness of need for treatment and understanding the social consequences of the mental illness [1].

The identification of demographic factors associated with lack of insight has proved complicated. Some authors found evidence that age [33], female gender [10,31] and lower educational level [30,31,36] were associated with poor insight, yet others found no evidence for such an association [2,11,18,41,42].

A large number of studies examined the relationship between insight and psychopathology, but results again were mixed [2,21,31,32,34,38,40,42,44]. A meta-analysis of 52
studies found an overall modest, but significant negative relationship between insight and both positive and negative symptoms, whereas the relation between depression and insight showed a modest but significant positive relationship [33]. Publication bias can limit the conclusions that can be drawn from a meta-analysis, especially in case of low correlations such as those reported for the association between insight and symptomatology.

The aim of this retrospective data analysis was to evaluate the association between insight and symptomatology, on 1213 schizophrenia spectrum patients. This very large sample would allow to confirm or refute the subtle associations between insight and symptomatology that were found using meta-analysis [33].

Moreover, specific symptoms, within the global, positive, negative and depressive symptom domains may be more related to insight than others. For that reason, the present study also assessed individual symptoms as explanatory variables of insight.

2. Subjects and methods

2.1. Sample and assessment methods

In 1999, a large scale project was started to improve standardized follow-up of hospitalized psychotic patients in Belgium. Forty-five wards of 13 psychiatric hospitals agreed to join the project. Since then, all hospitalized psychotic patients were routinely assessed by their caregivers every three to six months with a standardized assessment tool developed for the purpose of this project, the Psychosis Evaluation Tool for Common use by Caregivers (PECC). From 1999 to 2003, 1213 patients with schizophrenia or schizoaffective disorder were assessed with the PECC interview. None of the subjects refused to enter this follow-up routine and data collection. The present study reports on a retrospective analysis of the currently available data of 1213 patients included in the project from 1999 until 2003, all of them diagnosed with schizophrenia or schizoaffective disorder based on DSM-IV [4], as established by their treating psychiatrist.

For analysis, data from the first assessment of all participants were used. Descriptive and demographic data of the total sample are summarized in Table 1.

Participants were evaluated using the PECC by psychiatric nurses or the treating psychiatrist [12,13]. PECC evaluates 20 symptom items in five domains (positive, negative, cognitive, excitatory and depressive symptom domains) on seven point scales resulting in a possible total score between 20 and 140, Clinical Global Impression (CGI) [19], Global Assessment of Functioning (GAF) [20], early warning signs (EWS), activities of daily living (ADL), current medication, side-effects, non-pharmacological treatment, basic clinical and demographic variables as well as insight in the disorder (see further details in: [12–14]). Results from a validation study showed high correlation with both standard symptom and side-effects ratings [13]. Insight is measured on a four-point scale by two of its dimensions: awareness of having a mental illness (AMI) and awareness of having symptoms attributed to a mental illness (ASAMI). A higher score on the insight scale refers to lower level of insight (1 = good insight; 2 = insight in the majority of symptoms; 3 = insight in the minority of symptoms; 4 = insight is absent).

The study was approved by the hospital ethics committees and all subjects provided written informed consent.

2.2. Statistical analysis

Descriptive statistics were computed for basic demographic and clinical variables. Group comparisons were performed by means of t-test (two groups) or one-way ANOVA (multiple groups). Pearson correlations were computed to evaluate the associations between insight and symptomatology, and other clinical and demographic variables (illness duration, age and number of lifetime admissions). Regression analyses were carried out to examine the influence of symptomatology on insight. Symptoms, potentially contributing to lack of insight were identified through stepwise regression analysis and fed into a multiple linear regression model with insight as criterion. Variables identified in the correlation analysis as having a significant association with insight were also incorporated in the regression models.

3. Results

The sample consisted of mostly male patients (61%), with an average duration of illness of 91.1 years and five hospital admissions on average (Table 1). Based on the PECC insight items (AMI and ASAMI), 41.5% of the patient showed absent and 28% severely impaired insight into their illness (AMI), while 32% showed absent and 30% severely impaired insight with respect to ASAMI. At the same time, only 11% of the patients showed good and 19.6% moderately impaired insight.

Table 1

Descriptive data of the study sample.

| Total sample (n = 1213) |
|------------------------|
| Age (years, mean, range, S.D.) | 35.5 (16–83, S.D.: 11.9) |
| Male (%) | 61 |
| Female (%) | 39 |
| Educational level (n) (%) | |
| Primary school | 324 (26.7%) |
| Low secondary school | 325 (26.8%) |
| High school | 375 (30.9%) |
| Higher education/university | 136 (11.2%) |
| Unknown | 53 (4.4%) |
| Illness duration (years, S.D.) | 9.1 (8.9) |
| Admissions lifetime (n, S.D.) | 5.0 (5.0) |
| PECC total symptom score (mean, S.D.) | 54 (16.0) |
| PECC AMI scores (mean, S.D.) | 3.0 (1.0) |
| PECC ASAMI scores (mean, S.D.) | 2.8 (1.0) |

PECC: Psychosis Evaluation tool for Common use by Caregivers; AMI: awareness of having a mental illness; ASAMI: awareness of having symptoms attributed to a mental illness.
into their illness (AMI), while 14% of the patients showed good and 23.7% moderately impaired insight in attributing their symptoms to a mental illness (ASAMI).

3.1. Demographic characteristics and insight

A significant relationship between insight scores and gender was found, indicating that females had more impaired insight (AMI: \(t = 2.24, P = 0.0250\); ASAMI: \(t = 2.52, P = 0.0120\)). However, this association was mediated by significantly higher symptom scores in female patients \(F(1,1211) = 10.73, P = 0.0011\), as the effect of gender disappeared when symptomatology was taken into account. Educational level also showed a significant association with both insight items, indicating that higher educational level was associated with better insight (AMI: \(R = -0.16, P = 0.0001\); ASAMI: \(R = -0.15, P = 0.0001\); AMI: \(F(5,1177) = 10.31, P < 0.0001\); ASAMI: \(F(5,1177) = 9.54, P < 0.0001\)).

The correlation between insight and age reached significance although correlations were very low (AMI: \(R = 0.06, P = 0.0421\); ASAMI: \(R = 0.08, P = 0.0038\)). The correlation between insight and lifetime admissions was significant for AMI but not for ASAMI (AMI: \(R = 0.07, P = 0.0264\); ASAMI: \(R = 0.05, P = 0.1102\)).

No significant correlation was found between insight scores and duration of illness (AMI: \(R = 0.04, P = 0.1715\); ASAMI: \(R = 0.02, P = 0.5898\)).

3.2. Symptomatology and insight

Insight showed a negative correlation with severity of the illness, specifically both with the total symptom scores and CGI total score (Table 2). Significant negative correlations were found between insight – both items – and positive, negative, cognitive and excitatory symptoms (Table 2). Positive symptoms showed the strongest association with insight, although correlations were modest in all domains. No association between insight and depressive symptoms was found (Table 2). The correlations between insight and symptom domains explained only 18% (adjusted \(R^2 = 0.18\); AMI: \(F(5,1207) = 54.3; P < 0.0001\) and 22% (adjusted \(R^2 = 0.22\); ASAMI: \(F(5,1207) = 69.7; P < 0.0001\)) of variance in AMI and ASAMI, respectively.

Based on a stepwise regression analysis, specific symptoms were identified as explanatory variables of insight (Table 3). Of these, delusions, poor rapport, grandiosity, guilt feelings and social withdrawal showed the strongest associations with both insight items. Guilt feelings were the only item with a significant positive correlation with insight. This model explained 22% of the variance in AMI (adjusted \(R^2 = 0.22\); AMI: \(F(9,1203) = 38.6; P < 0.0001\)) and 26% in ASAMI (adjusted \(R^2 = 0.26\); ASAMI: \(F(9,1203) = 49; P < 0.0001\)). Adding number of lifetime admissions, age and educational level to these models did not considerably change the explained variance, as the model including these variables only explained 24% (adjusted \(R^2 = 0.24\); AMI: \(F(14,908) = 21.8; P < 0.0001\)) and 28% (adjusted \(R^2 = 0.28\); ASAMI: \(F(14,908) = 26.2; P < 0.0001\)) of variance in AMI and ASAMI, respectively.

4. Discussion

In the present study, a cross-sectional, retrospective analysis was conducted in a large naturalistic sample of patients with schizophrenia, in order to investigate the relationship between demographic variables, symptomatology of schizophrenia and insight.

Educational level showed a significant association with insight, which is in agreement with the majority of other findings in the literature [36,37]. A significant association was also found between insight and gender, but this was explained by symptom severity. Age and number of life-time admissions were also associated with insight, although the strength of these associations was very low.

Insight was related to overall symptom severity and four out of the five examined symptom domains of PECC, showing significant but modest negative correlation with overall symptom severity, positive, negative, excitatory and cognitive symptoms, but not with depressive symptoms. Of these symptom domains, positive symptoms showed the strongest relation to insight.

The inverse relation between insight and symptom severity is in line with several previous studies [11,22,31,37,40,42]. However, the absence of an association between depressive symptoms and insight is rather surprising in light of other findings in the literature [16,33,34,38,44]. Depression was hypothesized and several times proved to be in a positive relation with insight based on different theories, as summarized by Mutsatsa et al. [35]. However, a recently published paper suggested that insight affects mood indirectly, through mediating variables, such as social support [21]. A possible explanation for the lack of association between insight and depressive symptoms in the present study may be situated in the single-item assessment of depression instead of a more detailed and specific depression assessment. The significant association between insight and guilt feelings is in line with this explanation.

Taken together, the results of the present study suggest that impaired insight among patients with schizophrenia may in part be a direct effect of symptoms (e.g. through decreased reality

### Table 2

|                   | AMI (R) | P     | ASAMI (R) | P    |
|-------------------|---------|-------|-----------|------|
| PECC positive symptoms | 0.32    | <0.0001 | 0.35      | <0.0001 |
| PECC negative symptoms | 0.25    | <0.0001 | 0.26      | <0.0001 |
| PECC cognitive symptoms | 0.31    | <0.0001 | 0.37      | <0.0001 |
| PECC excitatory symptoms | 0.19    | <0.0001 | 0.19      | <0.0001 |
| PECC depressive symptoms | 0.02    | NS     | 0.03      | NS    |
| PECC total symptom score | 0.33    | <0.0001 | 0.36      | <0.0001 |
| CGI total score | 0.33    | <0.0001 | 0.34      | <0.0001 |

AMI: awareness of having a mental illness; ASAMI: awareness of having symptoms attributed to a mental illness; PECC: Psychosis Evaluation tool for Common use by Caregivers; CGI: Clinical Global Impression.

a Correlation values refer to PECC insight item scores: 1 = good insight; 2 = insight into the majority of symptoms; 3 = insight into the minority of symptoms; 4 = absent insight.
AMI: awareness of having a mental illness; ASAMI: awareness of having symptoms attributed to a mental illness.

The reported significant correlations with symptom misattribution [5,17,28]. Furthermore, second order ToM deficits explained a substantial proportion (over 22%) of the variance in insight ratings. Lysaker et al. [29] reported that understanding social causality and social perceptual capacities were independently related to insight and together predicted over one-third of the variance in insight ratings. These conceptualizations may be not exclusive but rather overlapping, creating a complex system to explain poor insight in patients with schizophrenia [21,36,46,48].

Beside the strength of the present study, namely the large, naturalistic sample, certain limitations should be taken into consideration when interpreting the results. First, insight was measured by only two of its dimensions by an instrument not directly validated against other insight measurement tools. The structure and items of PECC was based on the structure and items of PANSS and was validated against PANSS. PANSS includes only a single insight item. Validation studies proved that there is high correlation between the measured insight item by PANSS and other, more recently developed insight questionnaires [25]. Thus, we believe that the insight items measured by PECC are comparable to those measured by other tools in the literature. Second, evaluations were conducted by different raters in the different sites, who were also responsible for the clinical management of the patients. We have no information on their inter-rater reliability. Nevertheless, the overall inter-rater reliability of PECC was previously demonstrated to be satisfactory [13]. Third, the analysis is retrospective and cross-sectional, needing to be supplemented with prospective analyses to explore how changes in insight over time are associated with changes in symptomatology.

These prospective studies should also be supplemented with studies assessing other possible correlates of insight, such as neurocognition, social cognition or personality factors, in order to reveal the system of underlying, potentially overlapping, factors explaining impaired insight in patients with schizophrenia.

| Predictors                  | AMI                      | Predictors                  | ASAMI                      |
|-----------------------------|--------------------------|-----------------------------|-----------------------------|
| Parameter estimate          | P                        | Parameter estimate          | P                           |
| **Symptoms**                |                          |                             |                             |
| Delusions                   | 0.13                     | Delusions                   | 0.14                        |
| Hallucinations              | −0.03                    | Hallucinations              | −0.04                       |
| Grandiosity                 | 0.06                     | Grandiosity                 | 0.10                        |
| Passive/apathic social withdrawal | 0.09               | Passive/apathic social withdrawal | 0.08                        |
| Poor rapport                | 0.07                     | Poor rapport                | 0.08                        |
| Depression                  | −0.06                    | Depression                  | −0.04                       |
| Guilt feelings              | −0.08                    | Guilt feelings              | −0.11                       |
| Abstract thinking           | 0.05                     | Abstract thinking           | 0.06                        |
| Hostility                   | 0.05                     | Hostility                   | 0.07                        |
| **Other predictors**        |                          |                             |                             |
| Lifetime admissions         | −0.02                    | Lifetime admissions         | −0.01                       |
| Age                         | 0.003                    | Age                         | 0.004                       |
| Primary school              | 0.3                      | Primary school              | 0.28                        |
| Lower secondary school      | 0.13                     | Lower secondary school      | 0.06                        |
| High school                 | −0.01                    | High school                 | −0.05                       |
| Higher education            | 1.92                     | Higher education            | 1.6                         |

AMI: awareness of having a mental illness; ASAMI: awareness of having symptoms attributed to a mental illness.
5. Conclusion
Lack of insight in schizophrenia is partially explained by clinical symptoms and demographic measures.

6. Conflicts of interests

Financial disclosure: Dr. De Hert has been a consultant for, received grant/research support and honoraria from, and been on the speakers/advisory boards of Astra Zeneca, Lundbeck JA, Janssen-Cilag. Eli Lilly, Pfizer, Sanofi and Bristol-Myers Squibb. Dr Simon has no conflicts of interest to declare relative to the article. Dr Vidovic has no conflicts of interest to declare relative to the article. Dr Franic has no conflicts of interest to declare relative to the article. Dr. Peuskens has been a consultant for, received grant/research support and honoraria from, and been on the speakers/advisory boards of Astra Zeneca, Lundbeck JA, Janssen-Cilag. Eli Lilly, Pfizer, Sanofi and Bristol-Myers Squibb. Dr. van Winkel has been a consultant for Eli Lilly and has received honoraria from Eli Lilly and Janssen-Cilag.

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