Pretreatment social functioning predicts 1-year outcome in early onset psychosis


Objective: The aim was to investigate the association of pretreatment social functioning (12 months before initial presentation) with symptom dimensions and social functioning at 1-year follow-up.

Method: Fifty-six adolescents, age 14–18, first admitted for early onset psychosis, were evaluated at baseline and 1-year follow-up assessing psychopathology (PANSS), social functioning (Strauss and Carpenter Prognostic Scale), and duration of untreated psychosis (DUP).

Results: Adolescents with low pretreatment social functioning were at risk of more severe negative symptoms and lower social functioning at follow-up. Negative symptoms at baseline were less predictive and DUP was not predictive in this sample.

Conclusion: Results of this study suggest a strong longitudinal inter-relatedness between social functioning and negative symptoms in this age group. An integrative treatment approach including family interventions, social skills training, long-term specialized work/school rehabilitation, and adequate antipsychotic treatment is warranted to improve both, social functioning and negative symptoms.

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Key words: Schizophrenia; adolescence; social functioning

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Significant outcomes

- Results suggest a strong longitudinal inter-relatedness between social functioning and negative symptoms in early onset psychosis.
- The duration of untreated psychosis was weakly associated with social functioning and not with negative or positive symptoms at follow-up in this sample.

Limitations

- The study sample was recruited from treatment sites in Germany, Switzerland, and Austria. Replication is required in a population-based sample.
- Generalizability may be further limited in that older and male adolescents were more likely to become non-completers of the study.
- The small sample size may be related to type II errors potentially causing false negative results such as the missing association between DUP and outcome.
Introduction

Early detection and intervention programmes aim at improving outcome in psychosis by early detection and the provision of effective, phase-specific treatments (1). Over the past decade, these services have been established in USA, Canada, Australia and several European countries (2). In order to overcome barriers to continuity of care, many of these services provide both, adolescents and adults, with treatment. Accordingly, there is increasing interest in prospective longitudinal studies of early onset psychosis (EOP). Especially, studies systematically identifying predictors of less favourable outcomes are important. A better understanding of these predictors may help to apply care more specifically to this age group, which may lead to better outcomes and to cost-effectiveness of interventions (2).

The few existing studies on the prediction of outcome in juvenile psychosis suggest that – comparable with results from first-episode psychosis studies – the severity of positive and negative symptoms (3), an insidious onset of illness (4) low premorbid functioning (3, 5) are associated with an unfavourable outcome, i.e. mainly negative symptoms and low social functioning, at follow-ups between 1 and 42 years.

Premorbid as well as pretreatment social functioning in EOP and its association to outcome is important as prodromal and psychotic symptoms hit adolescents in the midst of their bio-psychosocial development (6). Research suggests that premorbid social and developmental impairment is more common in EOP compared with adult onset schizophrenia (7–11), particularly in early onset schizophrenia (12). Additionally, results of a retrospective study by Hollis (12) of 110 subjects with EOP point to a specific continuity between premorbid impairment and negative symptoms in this age group. To date, there is no study on the association between social functioning within the 12 months before initial presentation (pretreatment social functioning) and symptomatic and functional outcome in EOP. In a first-episode sample (including a few patients with EOP; 13) pretreatment social functioning was reported to be predictive of a composite criterion ‘course of illness’ and of ‘social disability’ 36 months after initial hospitalization.

Aims of the study

The aim of this prospective longitudinal multicentre study was to investigate the relationship between pretreatment social functioning and 1-year outcome adjusting for relevant predictors [socio-demographic characteristics, baseline psychotic symptom dimensions, and duration of untreated psychosis (DUP)]. The 1-year outcome criteria were psychotic syndromes (positive and negative syndromes) as well as social functioning.

Material and methods

Context and sample

Adolescents enrolled were subjects with EOP consecutively admitted to 12 university- and non-university sites in Switzerland, Germany, and Austria (VESPA-group) between March 1999 and January 2002. Inclusion criteria were i) DSM-IV-diagnoses of schizophrenia, other schizophrenia spectrum disorders, and affective disorders with psychotic symptoms including bipolar I disorder and major depressive disorder with psychotic symptoms; ii) age 12–18 years; iii) first treatment due to psychotic illness; and iv) a full scale IQ ≥70. Exclusion criteria were psychotic syndromes related to neurological or systemic disease.

Fifty-six subjects were enrolled. At the time of study entry, 42 subjects were in-patients and 14 out-patients. The comparably long-recruitment period was due to the low incidence of subjects first admitted for EOP in the participating sites. A few subjects were not enrolled despite fulfilled inclusion criteria due to organizational reasons.

Procedure

This is a prospective longitudinal multicentre study of the VESPA-group. To all subjects, a battery of assessment scales was administered at baseline (within the first 6 weeks after initiation of treatment) and at 1-year follow-up. All subjects were treated according to international guidelines for EOP (14) with comparable psychopharmacological as well as psychosocial treatments across the participating sites. Written informed consent was obtained from subjects and their legal guardians. All local ethics research committees approved the study.

Study monitoring and data processing was performed by one site. Raters were trained extensively by authorized trainers in the application of assessment scales before and repeatedly during the course of the study [especially SCID-I and Positive and Negative Syndrome Scale (PANSS)]. Inter-rater reliability tests were not performed. Problems with assessments were discussed individually on a help-line or at regular follow-up meetings twice a year. This procedure assured data quality and minimal missing data.
Pretreatment social functioning in early psychosis

DSM-IV diagnoses were ascertained by SCID-interviews, adapted by Sass et al. (15). Besides socio-demographic data and several pretreatment variables at baseline, subjects’ psychopathology, social functioning, and severity of illness were assessed at baseline and 1-year follow-up.

Baseline variables were assessed as follows: psychopathology was evaluated by the PANSS (16). Subjects’ severity of illness was assessed by the Clinical Global Impressions Scale – Severity of Illness (CGI-S; 17). For the assessment of pretreatment social function during the previous 12 months the Strauss and Carpenter Prognostic Scale (SCS, 18) was administered. SCS is a prognostic scale (age range 14–45) with established reliability and validity (19) designed for the prediction of outcome in psychotic patients. For data analysis, SCS social functioning, as derived from factor analysis in a study on first episode psychosis (including some subjects with EOP; 13) was used (items: number and quality of social relations, quantity and quality of useful work/school, and ‘fulfilment in life’ during the previous year). All items include five response categories (0–4; low numbers indicating low functioning). The item ‘marital status’, inappropriate in this age group, was omitted. A preliminary examination of the SCS social functioning’s internal consistency in this sample revealed a Cronbach’s alpha (α = 0.78) similar to results reported by Haendel et al. (13). DUP was determined by assessing the time span between the first positive symptoms until the first effective treatment. Criteria for the presence of any positive symptom were hallucinations, delusions or thought disorders with an estimated PANSS-rating of ≥4 (20). The symptom must have lasted throughout the day for several days or several times a week. Ratings were based on interviews with patients and family members and on all additional clinical information available within the first 6 weeks after initial presentation.

The outcome criteria were PANSS total score, PANSS positive and PANSS negative subscores at 1-year follow-up as well as social functioning during the 1-year follow-up period as assessed with SCS social functioning.

Data analysis and statistical tests

Demographic and clinical data were summarized for baseline and 1-year follow-up. Preliminary analyses of the distribution of continuous predictor variables showed that DUP was significantly positive skewed which logarithmic transformation normalized. Explorative analyses were performed to assess changes in PANSS subscales, CGI and SCS social functioning over time by paired-samples t-tests. The bivariate associations (Pearson’s correlations) between pretreatment social functioning, DUP, and other clinical baseline variables and outcome criteria at 1-year follow-up are presented. The strength of association between pretreatment social functioning and outcome criteria was assessed using sequential multiple regression analysis. Separate analyses were conducted for each of these outcome measures as the dependent variable. The predictors were entered in three blocks to test whether SCS social functioning independently predicts the respective outcome criteria after incorporating the a-priory effects of potentially confounding baseline variables (block 1) as well as DUP (block 2). Beside age and gender, only baseline variables whose univariate associations with the respective outcome criterion had *P*-values of 0.10 and under were entered in block 1 to derive a parsimonious model that weighted the predictors appropriately. The predictive utility of SCS social functioning on outcome criteria was tested by assessing the change of $R^2$ between a model with and without SCS social functioning at baseline. Assumptions of multiple regression analyses were examined strictly. The data were analysed by spss, version 11.0 (SPSS Inc. Chicago, IL, USA).

Results

Sample

Of 56 adolescents, 41 could be traced for follow-up assessments. Subjects who were non-completers of

<table>
<thead>
<tr>
<th>Sample description</th>
<th>n (%)</th>
</tr>
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<tbody>
<tr>
<td>Age, mean (SD)</td>
<td>16.2 (1.4)</td>
</tr>
<tr>
<td>Gender male</td>
<td>21 (51.1)</td>
</tr>
<tr>
<td>Living situation</td>
<td></td>
</tr>
<tr>
<td>Both parents</td>
<td>27 (65.9)</td>
</tr>
<tr>
<td>One parent</td>
<td>13 (31.7)</td>
</tr>
<tr>
<td>Out of home</td>
<td>1 (2.4)</td>
</tr>
<tr>
<td>Parents divorced</td>
<td>17 (41.5)</td>
</tr>
<tr>
<td>Socioeconomic status</td>
<td></td>
</tr>
<tr>
<td>Lower</td>
<td>18 (46.3)</td>
</tr>
<tr>
<td>Middle</td>
<td>19 (46.3)</td>
</tr>
<tr>
<td>Upper</td>
<td>4 (9.8)</td>
</tr>
<tr>
<td>Co-morbid substance abuse</td>
<td>9 (22.0)</td>
</tr>
<tr>
<td>Treatment setting</td>
<td></td>
</tr>
<tr>
<td>Hospitalized at baseline</td>
<td>30 (73.2)</td>
</tr>
<tr>
<td>Out-patients at baseline</td>
<td>11 (26.8)</td>
</tr>
<tr>
<td>DUP (median, first and third quartiles in weeks), mean (SD)</td>
<td>8 (3–50)</td>
</tr>
<tr>
<td>Diagnostic distribution</td>
<td></td>
</tr>
<tr>
<td>Schizophrenia</td>
<td>17 (41.5)</td>
</tr>
<tr>
<td>Schizophrenia spectrum</td>
<td>18 (43.9)</td>
</tr>
<tr>
<td>Affective psychoses</td>
<td>6 (14.6)</td>
</tr>
</tbody>
</table>

DUP, duration of untreated psychosis.
Characteristics at 1-year follow-up

The clinical data at follow-up are displayed in Table 2. The PANSS total score improved between baseline and 1-year follow-up ($t = 5.2$, d.f. = 40; $P = 0.001$) as well as the PANSS subscale scores (positive: $t = 4.9$, d.f. = 40; $P < 0.001$; negative: $t = 4.1$, d.f. = 40; $P = 0.001$; global: $t = 4.8$, d.f. = 40; $P < 0.001$). No significant improvement of SCS social functioning was detected ($t = 0.8$; d.f. = 40; $P = 0.444$).

Prediction of outcome criteria

Table 3 displays the bivariate associations between clinical baseline variables and outcome criteria (Pearson’s correlation) indicating that PANSS negative and SCS social functioning at baseline were associated with PANSS total and PANSS negative scores as well as SCS social functioning at follow-up. With a trend towards statistical significance, DUP was associated with SCS social functioning ($r = 0.30$; $P = 0.075$). A trend toward a significant difference in PANSS total score was detected between males and females ($t = -2.0$; d.f. = 39; $P = 0.056$). Further exploration of gender effects on the PANSS subscores revealed that females had higher PANSS global scores at follow-up than males ($t = -2.2$; d.f. = 39; $P = \ldots$)

Table 3. Bivariate associations between clinical baseline variables and outcome criteria (Pearson’s correlation)

<table>
<thead>
<tr>
<th>Baseline variables</th>
<th>PANSS total</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>r</td>
<td>$P$-value</td>
<td>r</td>
<td>$P$-value</td>
<td>r</td>
<td>$P$-value</td>
<td>r</td>
</tr>
<tr>
<td>Age</td>
<td>$-0.02$</td>
<td>0.196</td>
<td>0.02</td>
<td>0.887</td>
<td>$-0.09$</td>
<td>0.589</td>
<td>0.21</td>
</tr>
<tr>
<td>DUP (log)</td>
<td>0.30</td>
<td>0.079</td>
<td>0.09</td>
<td>0.627</td>
<td>0.22</td>
<td>0.205</td>
<td>0.14</td>
</tr>
<tr>
<td>CGI severity score</td>
<td>0.12</td>
<td>0.426</td>
<td>$-0.02$</td>
<td>0.927</td>
<td>0.21</td>
<td>0.197</td>
<td>$-0.34^*$</td>
</tr>
<tr>
<td>PANSS scores</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total score</td>
<td>0.13</td>
<td>0.426</td>
<td>0.02</td>
<td>0.907</td>
<td>0.15</td>
<td>0.310</td>
<td>$-0.37^*$</td>
</tr>
<tr>
<td>Positive score</td>
<td>$-0.08$</td>
<td>0.593</td>
<td>$-0.05$</td>
<td>0.744</td>
<td>$-0.12$</td>
<td>0.442</td>
<td>$-0.09$</td>
</tr>
<tr>
<td>Negative score</td>
<td>0.32*</td>
<td>0.049</td>
<td>0.13</td>
<td>0.420</td>
<td>$0.44^{**}$</td>
<td>0.004</td>
<td>$-0.60^{**}$</td>
</tr>
<tr>
<td>Global score</td>
<td>0.08</td>
<td>0.627</td>
<td>$-0.02$</td>
<td>0.884</td>
<td>0.08</td>
<td>0.603</td>
<td>$-0.25$</td>
</tr>
<tr>
<td>SCS social functioning†</td>
<td>$-0.33^*$</td>
<td>0.032</td>
<td>$-0.17$</td>
<td>0.303</td>
<td>$-0.40^{**}$</td>
<td>0.010</td>
<td>0.64**</td>
</tr>
</tbody>
</table>

†Strauss and Carpenter Prognostic Scale (SCS), Social Functioning Factor (10).

*P < 0.05; **P < 0.01.
pretreatment SCS social functioning (block 3) resulted in a significant increment of $R^2$. The total variance of PANSS total score at follow-up explained was 27.8% (adjusted $R^2 = 0.278; F = 3.5; P = 0.013$) with significant contributions by gender and pretreatment social functioning in the full model (block 3).

Model 2: prediction of PANSS-negative score at follow-up

More negative symptoms at follow-up were associated with more negative symptoms at baseline in block 1, but not with age or gender. Again, the inclusion of DUP (block 2) did not result in a significant increment of $R^2$ as indicated by $R^2$-change statistics in Table 4, while including SCS social functioning at baseline (block 3) resulted in a significant increment of $R^2$. The total variance of PANSS negative score at follow-up explained was 30.1% (adjusted $R^2 = 0.301; F = 3.8; P = 0.009$) with a significant contribution by pretreatment social functioning only in the full model (block 3).

Model 3: prediction of SCS social functioning at follow-up

Due to the high association of PANSS negative with PANSS total score ($r = 0.75, P < 0.001$) and with CGI-S score ($r = 0.53, P < 0.001$), only the PANSS negative score was included in block 1. Worse social functioning at follow-up was predicted by more negative symptoms at baseline and, with a tendency toward statistical significance, younger age in block 1. The inclusion of DUP (block 2) did not result in a significant increment of $R^2$ as indicated by $R^2$-change statistics in Table 4, while the inclusion of pretreatment social functioning (block 3) resulted in a significant increment of $R^2$. The total variance of SCS social functioning at follow-up explained was 38.4% (adjusted $R^2 = 0.584; F = 10.3; P < 0.001$) with a significant contribution by age, negative symptoms, and pretreatment social functioning in the full model (block 3).

Discussion

In this longitudinal study, adolescents with psychoses receiving their first in-patient or out-patient treatment were characterized by baseline and 1-year follow-up social functioning and psychotic syndromes. To our knowledge, this is the first study on the predictive validity of pretreatment social functioning for symptomatic and functional outcome in adolescents. Strengths of this study include a relatively large EOP sample compared with other studies and its prospective longitudinal design.
Notably, the DUP (median 8 weeks) is shorter than in most first-episode psychosis (FEP) samples with adult onset psychoses (20). One plausible explanation would be that adolescents, compared with adults, usually are under closer supervision by family and teachers who may more easily recognize a change in behaviour and initiate assessment early. Seventeen subjects (26.8%) were non-completers of the study. This rate was similar to the one reported in other studies on EOP (e.g. 5). Non-completers were older at baseline and more likely male, while PANSS subscores and pretreatment social functioning, the key variables in this study, were similar to the scores in those subjects traced at 1-year follow-up.

**Key findings**

Pretreatment social functioning 12 months before initial presentation (SCS social functioning) was the best predictor of total and negative PANSS scores and social functioning at 1-year follow-up in univariate as well as in multivariate analyses. Compared with pretreatment social functioning, other baseline variables, e.g. positive symptoms and DUP, were less predictive. Notably, social functioning at follow-up was predicted by both, negative symptoms at baseline and pretreatment social functioning independently in this study. These findings stress the inter-relatedness between social functioning and the course and severity of negative symptoms and add to the respective literature in EOP (12) as well as in FEP (21–23). Recently, Malla et al. (24) reported an association between negative symptoms and various aspects of subjective quality of life, namely ‘social relations’ and ‘activities of daily living’, indicating that the inter-relatedness between social functioning and negative symptoms goes beyond objective measures and influences the subjective well-being.

With regard to other baseline predictors, gender was associated with the PANSS total score at follow-up, mainly due to higher global scores at follow-up in females, namely depression, guilt feelings, and anxiety on item level. Notably, substance use at baseline was not related to any outcome criterion in line with the recent study on a large FEP sample by Lambert et al. (25), where persistent substance use over the follow-up period rather than baseline substance use was predictive of remission of positive symptoms. The association between DUP and outcome criteria was weak in the univariate and multivariate analyses. The latter result appears not to be caused by the inter-relatedness of independent predictors; DUP was not or only weakly associated with age, gender, negative symptoms at baseline or pretreatment social functioning. One possible explanation, in line with Oosthuizen et al. (26), could be that the predictive utility of DUP for symptomatic improvement may only become evident in follow-ups of >21 months. However, results with regard to DUP should be interpreted with caution due to a possible type II error related to the small sample size.

**Limitations**

Limitations of the study are mainly linked to i) the small sample size and potential selection bias; ii) the lack of inter-rater-reliability measures; and iii) missing assessments of other relevant variables potentially predictive of outcome.

i) The small sample size, although large relative to other EOP samples, is mainly because EOP is a rare and difficult to study population. Therefore, especially the missing association of some variables with outcome criteria may be related to a type II error. Generalizability of the results may be limited by the fact that a hospital-based rather than an epidemiological sample was assessed. Furthermore, a few admitted subjects were not included due to organizational reasons rather than subjects’ severity of illness or refusal. Older and male subjects were more likely to become study non-completers. This may further limit the representativeness of the sample. ii) The necessary multi-centre-study approach leads to possible inter-rater-reliability problems, and inter-rater-reliability tests were not performed. However, an effort was made to minimize reliability problems by extensive rater trainings and monitoring as described in the methods section. Additionally, heterogeneity with respect to centres as well as raters minimizes the probability of systematic centre- or rater bias. iii) It would be interesting to assess other variables potentially inter-related with the course and severity of negative symptoms and social functioning in this age group such as premorbid functioning and cognitive functioning at baseline, or to assess other outcome variables such as subjective quality of life or cognitive functioning.

**Clinical implications**

Apart from psychopathological measures, the longitudinal assessment of social functioning is needed for adolescents with psychotic disorders. An adjusted social functioning factor derived from the Strauss Carpenter Prognostic Scale may be an appropriate measure. The study results
suggest a strong longitudinal inter-relatedness between social functioning and negative symptoms in this age group. This is a significant finding, given the fact that continued social impairment is an important marker of developmental stagnation in adolescence. Therefore, the inclusion of strategies to improve social functioning and negative symptoms in the treatment plan as early as possible is clearly warranted. While negative symptoms may be treated by appropriate medication including antipsychotics and antidepressants, social functioning may be improved by including the social network (family) in the treatment plan as early as possible and by improving individual patients’ coping mechanisms, work situation and social skills. The improvement of social functioning may itself reduce negative symptoms and vice versa. It should be noted that too high antipsychotic doses – depending on the agent used – may interfere with patients’ activity level and limit psychosocial interventions aimed at improving social functioning. Therefore, a minimal-effective-dose approach is recommended. These clinical recommendations are in line with international guidelines for the treatment of first-episode as well as EOP (14, 27).

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References

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