Predicting 5-Year Outcome in First-Episode Psychosis: Construction of a Prognostic Rating Scale

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Objective: The aim of this study was to construct a rating scale to predict long-term outcome on the basis of clinical and sociodemographic characteristics in patients with symptoms of psychosis who seek psychiatric help for the first time.

Method: Patients (N = 153) experiencing their first episode of psychosis (DSM-IV schizophrenia, schizophreniform disorder, schizoaffective disorder, brief psychotic episode, delusional disorder, affective psychosis with mood-incongruent delusions, or psychotic disorder not otherwise specified or being actively psychotic) were consecutively recruited from 17 psychiatric clinics in Sweden from January 1996 through December 1997 (24 months). Baseline characteristics were assessed with an extensive battery of psychiatric rating scales; duration of untreated psychosis, premorbid characteristics, and cognitive functioning were also assessed. The relationship between baseline characteristics and the 5-year outcome was analyzed using a stepwise logistic regression model.

Results: In the logistic regression analysis, 5 variables were found to have unique contributions in the prediction of outcome. In order of magnitude of the odds ratios, these variables were Global Assessment of Functioning (GAF) score during the year before first admission, education level, actual GAF score at first admission, gender, and social network. The sensitivity, i.e., correctly identified cases (poor outcome), was 0.84, and the specificity, i.e., the correctly identified noncases (good outcome), was 0.77.

Conclusion: To initiate adequate interventions, it is crucial to identify patients experiencing their first episode of psychosis who are likely to have an unfavorable long-term outcome. The predictive rating scale described here is a feasible tool for early detection of these patients.

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To initiate adequate interventions, it is crucial to identify patients who are facing an unfavorable long-term outcome among those experiencing their first episode of psychosis.[1] In the past decade, the predictive powers of baseline characteristics on functional and symptomatic outcome have been investigated in several studies. A long duration of untreated psychosis (DUP),[2–10] abnormal electroencephalographic (EEG) findings,[11] cognitive dysfunction,[12,13] negative symptoms,[2,14–19] a baseline diagnosis of a schizophrenia spectrum disorder,[20,21] a family history of psychosis,[21,22] male gender,[20,22–24] poor premorbid adjustment,[20,25–27] and lateral ventricular enlargement[28] have all been found to be associated with poor long-term outcome.

On the basis of these studies, it should be possible to predict long-term outcome in patients with first-episode psychosis at their first admission to psychiatry. A scale based on the relative and unique contributions of the above-mentioned baseline characteristics to long-term outcome has not been constructed in contemporary psychiatric research, however.

Prognostic scales for patients with psychosis have been developed independently by Phillips,[29] Vaillant,[30] Strauss and Carpenter,[31] and Stephens et al.[32] Of these, the Strauss-Carpenter outcome scale proved to have the best stability of predictive power when retested in a new population.[33,34] However, because the Strauss-Carpenter rating scale included "duration of rehospitalization," it was not appropriate for first-episode psychoses and insensitive to changes in society. Furthermore, because these early scales were developed more than 20 years ago, they may be obsolete for current psychiatry.

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Factors associated with poor outcome in the early decades of the 20th century became incorporated as components of the definitions of schizophrenia.[35] Yet, current definitions of schizophrenia are more or less heterogeneous in relation to outcome, and the 6-month duration criterion of a DSM-IV schizophrenia diagnosis restricts its use in first-episode studies.[36,37]

Lack of congruence in the classification of psychotic disorders between the 2 major classification systems, ICD-10 and DSM-IV, and the heterogeneity of the response to antipsychotic medication in patients suffering from schizophrenia spectrum disorders suggest a different approach to the question of outcome.[38,39] Furthermore, the initial 2-year stability of a specific baseline diagnosis in patients with first-episode psychosis is unsatisfying, suggesting that rigid adherence to DSM-IV should be avoided.[40] Predictors of a poor outcome are well documented in several studies, both within and across diagnostic categories, and may therefore be of greater value than a specific diagnosis in the prediction of outcome at first admission of psychoses.[41]

An epidemiologic outcome study in Stockholm showed that 75% of first-episode patients with a schizophrenia syndrome and 47% of first-episode patients with other forms of psychoses had been granted an early retirement pension after 5 years.[42] Therefore, it is vital to identify patients with psychotic symptoms at risk of a poor long-term outcome, regardless of the specific baseline diagnosis.

In a review of 2000 clinical trials, Thornley and Adams[43] concluded that outcome measures in schizophrenia vary widely across studies and suggested that this problem should be addressed in future research. In patients with psychosis, especially schizophrenia, a broader definition of remission than just reduction in psychotic symptoms is warranted and hence clinical estimations of the overall functioning should be included.[44–47]

The aim of this study was to identify baseline clinical and sociodemographic characteristics in order to construct a predictive rating scale for early identification of patients experiencing their first episode of psychosis who are likely to have a poor long-term outcome.

METHOD

Patients who sought or were referred to psychiatric treatment for the first time regarding psychotic symptoms from January 1, 1996, through December 31, 1997 (24 months), were consecutively recruited in a need-adapted treatment, multicenter study consisting of 17 psychiatric clinics in Sweden (the Parachute Project). The recruitment procedure and the treatment program have been described in detail elsewhere.[48] A total of 175 patients met the inclusion criteria and consented to participate. At the 5-year follow-up, 153 patients (87%) remained in the study. The study was approved by the ethics committee at the Karolinska Institutet, Stockholm, Sweden.

To be included in the study, patients had to be between 18 and 45 years old and meet the DSM-IV criteria for schizophrenia, schizophreniform disorder, or schizoaffective disorder (narrow schizophrenia spectrum disorders) or for brief psychotic episode, delusional disorder, affective psychosis with mood-incongruent delusions, or psychotic disorder not otherwise specified or being actively psychotic. Patients could not have received previous treatment for psychosis and must have been able to understand or speak a Scandinavian language. Serious somatic illness, dominating substance abuse, and neurologic disorder served as exclusion criteria. All patients underwent a thorough somatic and psychiatric investigation, including a checklist of background variables and a series of rating scales covering symptoms (Brief Psychiatric Rating Scale [BPRS][49]) and social functioning (Strauss-Carpenter Outcome Scale,[50] Global Assessment of Functioning [GAF],[51] and Health of the Nation Outcome Scale [HoNOS][52]). In addition, all patients underwent a neuropsychological investigation and a structured diagnostic interview (Structured Clinical Interview for DSM-IV [SCID][53]). DUP was defined as the period between the first psychotic symptom and the first contact with psychiatric services. The estimation of DUP was based on the combined information from the patients and their relatives.

Of the 175 patients who met the inclusion criteria, 153 (81 men and 72 women) were evaluated at the 5-year follow-up. Their mean age was 28.8 years (SD = 6.67; range, 18–44 years), and the mean DUP was 14.4 months (SD = 37.17; median = 0.7; range, 0.0–207.70 months). At baseline, 54 patients (35%) had a schizophrenia spectrum disorder and 99 (65%) had a non–schizophrenia spectrum psychosis. No significant difference was noted between men (27.96 ± 6.24 years) and women (29.64 ± 7.07 years) in mean ± SD age at onset ($t = 1.57$, $df = 151$, $p = .119$).

Neuroleptic Medication

All patients with clinically significant psychotic symptoms that persisted for more than 1 week after first admission were given low doses of neuroleptic medication (mean ± SD = 1.56 ± 1.76, median = 1.00 equivalents of haloperidol during the week before the 3-month follow-up). Medication for daytime and nighttime sedation (benzodiazepines) was allowed from the first day. Neuroleptic medication was given in a naturalistic setting in which a low-dose regimen was applied.

Baseline Characteristics

Fourteen characteristics describing the patients' baseline clinical and sociodemographic characteristics were chosen based on their predictive power and feasibility of being assessed during the patients' first admission to psy-

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Table 1. Baseline Characteristics and Their Relationship to 5-Year Outcome in Patients With First-Episode Psychosis[a]

Variable	Outcome[b] Good, N (%)	Poor, N (%)	p Value
Patient's age is 25 y or less			.008
No	27 (32)	36 (53)	
Yes	58 (68)	32 (47)	
Duration of untreated psychosis less than 6 mo			.001
No	10 (15)	22 (42)	
Yes	55 (85)	30 (58)	
Gender			.007
Man	37 (44)	44 (66)	
Woman	48 (56)	23 (34)	
Education level only compulsory school			.018
No	70 (83)	44 (67)	
Yes	14 (17)	22 (33)	
Working/studying half-time or more			.001
No	28 (34)	40 (62)	
Yes	55 (66)	25 (38)	
Lives with parents			.018
No	72 (85)	46 (69)	
Yes	13 (15)	21 (31)	
Married or cohabits with another person			.001
No	50 (59)	56 (84)	
Yes	35 (41)	11 (16)	
Social support—capable of cooperation			.095
No	31 (37)	33 (50)	
Yes	54 (64)	33 (50)	
Social contacts—2 contacts or more with friends			< .001
No	20 (24)	34 (52)	
Yes	63 (76)	31 (48)	
Motivated for treatment			.579
No	52 (61)	38 (57)	
Yes	33 (39)	29 (43)	
GAF score > 70 during the year before first admission			< .001
No	34 (40)	47 (73)	
Yes	50 (60)	17 (27)	
Current GAF score > 30 at first admission			.023
No	30 (35)	35 (54)	
Yes	55 (65)	30 (46)	
Has had previous psychiatric contact(s)			.545
No	61 (72)	51 (76)	
Yes	24 (28)	16 (24)	
Significant alcohol consumption			.495
No	74 (87)	54 (83)	
Yes	11 (13)	11 (17)	

[a]Ns vary by variable because of missing data.
[b]Good outcome was defined as "living a normal life with or without neuroleptic medication with no need for support from professionals in daily life." Poor outcome was defined as "in need of continuous neuroleptic medication and support from professionals in everyday life matters."
Abbreviation: GAF = Global Assessment of Functioning.

chiatry. Two clinically experienced raters (L.F. and M.M.) dichotomized these 14 characteristics, with the intention to construct a simple yes/no rating scale that could be easily used by ordinary psychiatric staff. The dichotomization was determined on an a priori basis, and the cut-off levels were intended to distinguish "fairly normal" from "aberrant." The dichotomized variables are presented in Table 1.

Diagnoses

All baseline diagnoses were dichotomized into schizophrenia spectrum disorders (schizophrenia, schizophreniform disorder, schizoaffective disorder) and nonschizophrenia psychoses (brief psychotic episode, delusional disorder, affective psychosis with mood-incongruent delusions, or psychotic disorder not otherwise specified or being actively psychotic). The diagnostic cut-off was motivated by differences in outcome between these 2 diagnostic categories (as described in the Introduction) and a better stability of such a classification compared with specific diagnoses at first admission.

Neuropsychological Investigation

The test battery for the neuropsychological examination consisted of tests of intellectual ability, learning and memory, and executive functions (the Wechsler Adult Intelligence Scale, Revised as a Neuropsychological Instrument [WAIS-R-NI]).[54] Of the 153 patients followed up for 5 years, 101 underwent the neuropsychological investigation. The examination took place as soon as the patients were able to cooperate, which in most cases was within 3 months after their first admittance. The WAIS-R-NI comprises 6 verbal and 5 performance subtests. The verbal subtests are Information, Digit Span, Vocabulary, Arithmetic, Comprehension, and Similarities. The performance subtests, which are all timed and scored both for speed and accuracy, are Picture Completion, Picture Arrangement, Block Design, Object Assembly, and Digit Symbol. Further descriptions of the WAIS-R subtests can be found in Wechsler (1981)[55] or Lezak (1995).[56] The WAIS-R-NI Block Span subtest,[54] evaluating spatial immediate recall and spatial mental tracking, is a spatial correspondent to the WAIS-R subtest Digit Span.

Outcome Measure

The psychiatric staff went through an educational program, which included training in the clinical assessment procedure and recurrent meetings with rater testings, in order to assure validity of the ratings. To create a stable outcome measure, a clinical outcome measure was assessed during the fifth year after the patient's entry into the study. The mean time from baseline to outcome assessment was 5.35 years (range, 4.38–6.36 years). A poor outcome was defined as "in need of continuous neuroleptic medication and support from professionals in everyday life matters." The patient should have been unable to work/study in the open market, having a supported/sheltered occupation or being idle. The GAF score should have been < 60 for at least 6 months. A favorable outcome was defined as "living a normal life with or without neuroleptic medication with no need for daily-life support from professionals." The GAF score of ≥ 60 should have been stable for at least 6 months. The working/studying capacity should have been at least half-time in the open

market, and the patient should have had independent housing. The cut-off level between favorable and unfavorable outcome was decided on an a priori basis. Because the GAF ratings were performed by the ordinary psychiatric staff, the personnel were instructed to pay special attention to work and social capacities in those patients close to the cut-off level. This was done in order to make the dichotomy robust and less sensitive to symptom fluctuations. Forty-four percent of the patients (N = 68) fulfilled the criterion of unfavorable outcome. They were compared with the remaining patients (56%, N = 85).

Statistical Analysis

Two separate stepwise (forward) logistic regression analyses were performed. In the first analysis, all ratings of clinical symptoms according to BPRS were included, as well as the outcome score. The rating scores were dichotomized into 2 categories. Values 1 and 2 were categorized as "No symptoms" and values 3 through 7 as "Symptoms." In the second analysis, the 14 baseline characteristics and the outcome score were included (Table 1). In addition, the symptoms independently related to the outcome measure in the first analysis were included in this analysis ("feelings of guilt" and "odd content of thoughts"). The inclusion level applied in the regression analyses was 5%, i.e., the level at which a variable was considered to significantly contribute to the prediction of outcome.

Because of missing data, there was a noncongruent high dropout rate (N = 32) for the cognitive variables, resulting in an unacceptable high dropout rate in a logistic regression analysis. Differences in performance and verbal IQ between the 2 outcome groups were therefore compared in a 2-way repeated analysis of variance (groups × tests).

The relationship between diagnosis (schizophrenia spectrum disorder vs. nonschizophrenic psychoses) and outcome was analyzed with the χ^2 method. Statistical significance was set at $p < .05$ (2-tailed).

RESULTS

Predicting Clinical Outcome

In the first logistic regression analysis, 109 patients were included. Three symptom ratings were found to be significantly related to outcome: "feelings of guilt" (lower ratings = worse outcome; p = .008), "emotional withdrawal" (higher ratings = worse outcome; p = .033), and "anxiety" (lower ratings = worse outcome; p = .034). A tendency toward significance ($.05 < p \leq .10$) was identified for "hallucinations" (higher ratings = worse outcome; p = .065), "blunted affect" (higher ratings = worse outcome; p = .074), and "odd content of thoughts" (higher ratings = worse outcome; p = .080). In the logistic regression analysis, only 2 symptom ratings entered the regression equation with an independent contribution: "feelings of guilt" (Odds ratio [OR] = 3.17, 95% confidence interval [CI] = 1.40 to 7.14) in the first step and "odd content of thoughts" (OR = 2.39, 95% CI = 1.00 to 5.71) in the second. The increase in total hit rate, i.e., correctly classified patients by the 2 symptom ratings, was 7.3% (from 56.0% of the beginning block to 63.3%). Thus, absence of clinically significant feelings of guilt and presence of odd content of thoughts predicted worse outcome. The contribution of these 2 variables was unique, i.e., the correlation between the 2 variables was almost zero ($\phi = 0.02$, p = .828).

In the second logistic regression analysis (N = 100 because of 9 nonmatching dropouts), the 2 clinical symptom ratings from the first logistic regression analysis were included together with the global ratings of functioning and socioeconomic characteristics listed in Table 1, for an overall total of 16 variables; the variables were then dichotomized. Of these variables, 5 significantly contributed to the prediction of poor outcome, but none of these were symptom ratings. Consequently, another logistic regression analysis was performed to increase the number of included patients to 111 by excluding symptom ratings and thus reducing the CIs of the ORs. The 10 variables that predicted poor outcome were the highest GAF score < 70 during the year before falling ill ($p < .001$), social support (low rating; $p < .001$), employed less than half of full-time work during the year before falling ill ($p < .001$), meetings with friends less than twice a month ($p < .001$), duration of untreated psychosis of more than 6 months ($p < .001$), educational level not more than compulsory school (p = .002), gender (being male; p = .011), patient lives with his or her parents (p = .017), current GAF score below 30 at baseline ($p < .020$), and age (younger than 26 years at admission; $p < .021$).

In this logistic regression analysis, however, only 5 of the 10 variables had unique contributions to the prediction of outcome. In order of magnitude of the OR, these variables were GAF score during the year before falling ill, education, current GAF score at baseline, gender (being male) and social network (Table 2). Eighty-one percent of the patients were correctly classified by the regression equation (cut-off score = 0.50). The sensitivity, i.e., correctly identified cases (poor outcome) was 0.84 and the specificity was 0.77, i.e., correctly identified noncases (good outcome).

None of the individual variables had a higher hit rate than the combined ratings (GAF score during the year before falling ill [66%], education [66%], actual GAF score at baseline [60%], gender [being male, 61%], and social network [66%]). The intercorrelations between the 5 variables entered in the logistic regression equation were generally low (< 0.25). The highest correlations were ob-

Table 2. Odds Ratios for Variables Significantly (p ≤ .05) Contributing to the Prediction of a Poor Outcome in Patients With First-Episode Psychosis

Variables in the Equation	β	SE	p	OR	95% CI for OR
GAF score ≤ 70 in the year before admission	1.83	0.52	< .001	6.24	2.25 to 17.36
Compulsory school is the highest educational level	1.75	0.63	.005	5.73	1.68 to 19.49
Current GAF score ≤ 30	1.42	0.52	.006	4.13	1.49 to 11.45
Male	1.08	0.51	.034	2.95	1.09 to 8.04
Meets friends not more than 2 or 3 times per month	1.07	0.51	.036	2.90	1.07 to 7.86
Constant	–3.420	0.69			

Abbreviation: GAF = Global Assessment of Functioning.

served between GAF score during the previous year and number of social contacts (0.24, p = .002) and between education level and number of social contacts (0.18, p = .024).

A scale was established by adding the scores of these 5 variables. As only 4 patients had the highest score (i.e., a score of 5), these patients were grouped together with those with a score of 4 and hence the scale ranged from 0 to 4. The percentages of patients with a poor outcome at each score are presented in Figure 1. As seen in Figure 1, 78% of the patients with the highest score (score = 4) and 0% of the patients with no risk factor had a poor outcome.

Relationship Between Diagnosis and Outcome

Patients with a diagnosis of a schizophrenia syndrome at baseline were compared with those with other kinds of psychoses. Sixty-three percent of those with a diagnosis of schizophrenia syndrome had a poor outcome, compared with 35% of those with another type of psychosis ($\chi^2 = 11.25$, $p < .001$). A similar relationship was found after 1 year (65% vs. 33%; $\chi^2 = 13.65$, $p < .001$).

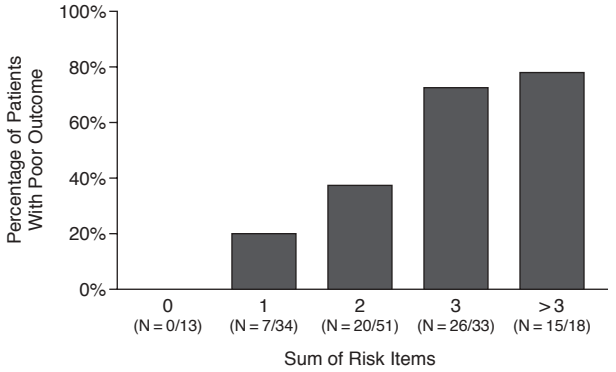
Relationship Between Diagnosis and Risk

The number of risk factors was significantly related to whether the patient had a diagnosis of schizophrenia spectrum disorder at baseline ($\chi^2 = 16.68$, p = .002). Fifty-three percent (N = 30) of the patients with a diagnosis of a schizophrenia spectrum disorder had 3 or more risk factors for a poor outcome as compared with 29% (N = 32) with a diagnosis of a non–schizophrenia spectrum disorder.

Relationship Between Cognitive Function and Outcome

Patients with a poor outcome generally exhibited worse cognitive performance (mean ± SD verbal IQ: 78.4 ± 15.40; performance IQ: 86.1 ± 14.73) than those with a better outcome (verbal IQ: 87.2 ± 16.52; performance IQ: 94.1 ± 18.34). This difference was statistically significant (F = 7.20, df = 1,155; p = .009).

Figure 1. Percentage of Patients With a Poor 5-Year Outcome Among Those With First-Episode Psychosis[a]



[a]Data for more than 1 variable were missing for 4 of the 153 participants. These 4 patients were all classified as having a favorable outcome.

5-Year Course of Illness Measured by GAF and BPRS Scores

After assigning all patients into 1 of 5 groups according to score on the predictive rating scale, descriptive statistics of symptoms (BPRS) and function (GAF) were made at baseline, at 3 months, and at 1, 3, and 5 years. The greatest changes in all groups were between baseline and the 3-month follow-up. The reduction in BPRS scores and the increase in GAF scores between baseline and the 3-month follow-up did not significantly differ between the 5 groups (Table 3).

Dropout Analysis

Of the included 175 patients, 153 (87%) remained in the study at the 5-year follow-up (Table 1). The dropouts (N = 22) did not wish to participate because of a reluctance to appear in a case register or because they moved from the catchment area. Patients moving to another area were followed up as research patients unless they refused to participate.

There were no significant differences in age, DUP, gender, education, marital status, social support, alcohol abuse, earlier psychiatric contact, social contacts, suicidality, motivation for treatment, current GAF score at baseline, or the symptom ratings. The only exception was a higher rating of blunted affect among the dropouts (3.4 vs. 2.4; p = .019). However, the dropouts had a significantly lower verbal IQ (84 vs. 91, p = .039), were less continuously employed (46% vs. 73%, p = .019), and contained a higher frequency of patients with a GAF score ≤ 70 in the year before admission (82% vs. 55%, p = .016).

The dropouts were compared with the patients included at follow-up in risk scores, i.e., all the characteristics at baseline, all symptom ratings according to BPRS score, cognitive functioning, and diagnosis at baseline.

Table 3. Ratings of Symptoms (BPRS) and Global Assessment of Functioning (GAF) During the 5-Year Follow-Up as Related to Score on the Predictive Rating Scale

	Predictive Rating Scale Score				
Variable	0 (N = 14)	1 (N = 35)	2 (N = 60)	3 (N = 43)	≥ 4 (N = 19)
BPRS score, mean ± SD					
At baseline	51.9 ± 7.18	53.9 ± 13.77	53.8 ± 13.33	58.4 ± 16.19	61.2 ± 12.66
At 3-mo follow-up	29.6 ± 8.30	34.3 ± 7.93	40.3 ± 16.69	39.4 ± 10.20	40.5 ± 10.22
At 1-y follow-up	29.3 ± 9.45	31.7 ± 8.72	35.9 ± 11.50	37.4 ± 10.38	36.5 ± 11.30
At 3-y follow-up	30.3 ± 6.40	34.5 ± 11.44	32.0 ± 7.82	38.9 ± 14.60	37.8 ± 12.87
At 5-y follow-up	28.6 ± 5.72	32.9 ± 9.18	35.2 ± 11.83	39.5 ± 14.05	38.3 ± 9.05
GAF score, mean ± SD					
Highest score during the year before baseline	83.3 ± 5.61	77.0 ± 10.76	67.3 ± 15.76	60.7 ± 12.08	52.9 ± 13.39
At baseline	38.6 ± 7.95	33.4 ± 8.40	31.5 ± 8.47	32.2 ± 8.15	27.8 ± 6.53
At 3-mo follow-up	67.6 ± 15.72	60.2 ± 12.95	56.7 ± 15.72	52.2 ± 13.45	45.9 ± 13.14
At 1-y follow-up	76.8 ± 11.77	65.7 ± 14.99	62.1 ± 14.69	55.1 ± 14.80	54.1 ± 16.29
At 3-y follow-up	72.7 ± 15.30	67.7 ± 15.31	65.6 ± 14.26	56.2 ± 12.93	52.2 ± 15.91
At 5-y follow-up	72.6 ± 10.40	69.1 ± 14.09	64.6 ± 16.28	53.9 ± 13.58	50.1 ± 15.84

Abbreviation: BPRS = Brief Psychiatric Rating Scale.

Table 4. Endpoint GAF Score in Relation to Score on the Predictive Rating Scale for Dropouts (N = 22)

	Predictive Rating Scale Score				
Endpoint GAF Score	0	1	2	3	≥ 4
< 60, N	0	1	6[a]	8[b]	1[c]
≥ 60, N	1	0	3	2	0

[a]One patient died from suicide after 3 months.
[b]One patient died from suicide after 3 years.
[c]The patient died from somatic sequels from drug abuse after 3 years.
Abbreviation: GAF = Global Assessment of Functioning.

No significant difference was observed between the dropouts and the study sample in the number of risk factors ($t = 1.38$, $df = 169$, $p = .168$), i.e., the risk for a poor outcome was equal in the 2 groups.

The patients dropped out between 3 months and 3 years after first admission and the last observed GAF rating. The risk factors in relation to the endpoint GAF measures for dropouts are shown in Table 4. Significantly more dropouts with a score of 3 or more on the predictive rating scale had an endpoint GAF score < 60 than dropouts with a score of 0 or 1 ($\chi^2 = 6.60$, $p < .01$).

DISCUSSION

A 5-item rating scale with a range of 0 to 4 predicting long-term outcome in patients at first admission with 81% accuracy was constructed. The patient characteristics that qualified as the most powerful predictors of the 5-year outcome were those representing the level of functioning before the first admittance to psychiatry. Thus, the patient's ability to manage social contacts, global functioning, male gender, and education before the onset of illness predicted long-term outcome better than psychotic symptoms, a finding consistent with other studies.[26,31] In a sample of patients with acute/subacute schizophrenia, Strauss and Carpenter[31] found that the most powerful predictors of long-term outcome were poor social relationships, the duration of the previous hospitalization, and unemployment. Fenton and McGlashan[57] also found that a low level of premorbid functioning predicted a poor 15-year outcome in patients with chronic schizophrenia. Thus, the highest level of functioning before the onset of illness seems to predict outcome, both in onset of psychosis and as the disease progresses to chronic schizophrenia.

It is unclear if the premorbid functioning represents unspecific factors different from the causes of psychotic symptoms. A low level of premorbid functioning also seems to predict poor outcome in depression.[58] The premorbid decline, however, seems to be specific to schizophrenia as indicated by an investigation of the timing of social decline in schizophrenia and affective psychosis.[59] Hence, the capacity for social relations, the highest GAF score the year before onset, gender, and the highest educational level achieved may not directly be specific for psychosis, but rather reflect a longitudinal aspect of the individual patient.

In a study by Gaebel and Pietzcker,[34] the Vaillant, Stephens, Phillips, and Strauss-Carpenter prognostic scales were used as potential outcome predictors at first admission. In prognostic validity, the Strauss-Carpenter scale proved superior to all of the other scales investigated. However, a prognostic relationship was established only for social outcome (e.g., employment and social contacts). The outcome measure is crucial in the evaluation of prognostic factors and treatment. In a survey of 2000 controlled trials over 50 years, Thornley and Adams[43] found 640 outcome rating scales and concluded that, despite the abundance of outcome scales, measures of both clinical and functional long-term outcome in large samples are scarce. The outcome measure in the present study includes clinical and functional dimensions, and, in order to obtain a robust outcome measure, the GAF scores should have been stable for the 6 months preceding endpoint. Two patients committed suicide and 1 died from somatic sequels of drug abuse before the 5-year follow-up. These

patients were correctly rated as having a potentially unfavorable outcome by the predictive rating scale.

One rationale for dividing the patients' diagnoses into the categories of schizophrenia spectrum disorders and nonschizophrenia psychoses is the finding of a better 2-year diagnostic congruence after first admission with such a classification compared with specific diagnoses.[40] In the present study, a baseline schizophrenia spectrum disorder was strongly associated with a poor 5-year outcome. Specifically, 63% of patients with a diagnosis of a schizophrenia spectrum disorder had a poor outcome, in line with previous findings.[42] However, 35% of those with other (nonschizophrenic) psychoses also had a poor outcome at the 5-year follow-up, which may limit the value of diagnosis as a tool of prediction. The predictive rating scale had a higher hit rate, with 84% of the patients being correctly classified with a poor outcome and 77%, with a good outcome. Furthermore, a baseline schizophrenia spectrum disorder may be a marker for recognizing patients at risk of a poor outcome, but the feasible aspects of the predictive rating scale may facilitate the recognition of patients at risk of a poor outcome in psychiatry and in other health care or community-based facilities.

A decline in cognitive functioning typically occurs in the early phase of a psychosis, especially in schizophrenia. If cognitive function is not restored during the remission period after the first acute phase of illness, the patient's social functioning may be insufficient, with a poor outcome as a consequence.[12,13] A neuropsychological test may therefore be a useful tool to recognize patients at risk for a poor outcome in the early phase of illness. In the present study, both the verbal and performance subtests of the WAIS-R-NI were associated with a poor 5-year outcome, but these tests did not enter the logistic regression model because of missing data. A neuropsychological test for the identification of patients at risk of a poor outcome may, however, be of limited clinical value. Patients at first admission with psychotic symptoms can hardly be expected to be subjected to extensive neuropsychological testing. Furthermore, such testing can rarely be performed by ordinary psychiatric staff. The present predictive rating scale offers an alternative that is easy to use, requires a minimum of training, and can be easily applied at first admittance.

Although a relationship between a long DUP and a poor 5-year outcome was found, it was not strong enough to enter the regression analysis. There is evidence that a shortened DUP improves prognosis.[10] However, although strategies reducing DUP are crucial in the initial phase of psychosis, there is still a controversy as to whether early intervention programs in first-episode patients can offer the prospect of altering the long-term course.[60] Furthermore, the comprehensive education and detection system to change DUP in first-onset psychosis may be difficult to achieve in ordinary clinical practice.[61] Thus, in addition to DUP-reducing strategies, early identification and treatment planning for patients at risk of a poor long-term outcome may be necessary to prevent a poor outcome.[7,62]

Absence of clinically significant feelings of guilt and presence of odd content of thoughts were associated with poor outcome, findings consistent with those of other studies.[57] However, because the 5 variables of the rating scale explained more of the 5-year outcome variance, these symptoms did not enter the logistic regression equation. Thus, psychotic symptoms may be useful in predicting the profile in recurrent psychopathology in an individual patient, but their prognostic value on long-term outcome seems to be limited.

Neuroleptic medication was given to patients with clinically significant psychotic symptoms 1 week after first admission. Although a low-dose regimen was applied throughout the study, doses were often individualized, making a dose-response analysis difficult. However, reductions in BPRS scores during the first 3-month period did not differ between patients with a potentially good or poor outcome according to the predictive rating scale, indicating that response to neuroleptic medication may not be a major determinant of long-term outcome.

Understanding the factors that predict outcome in first-episode psychosis can suggest a focus for prevention and treatment. Symptom alleviation must be a goal; however, for those patients who face a poor future, other interventions may be as important. Interventions for persons at risk of a poor outcome must be individualized and based on their personal profile. A person with a score of 4 or 5 may benefit from being assigned to a case manager with authority to monitor and coordinate the community services and psychiatric resources in order to prevent social decline.[63]

Early identification of those patients with first-episode psychoses who are at risk of a poor long-term outcome is crucial, since the social network, such as family and friends, is still available for cooperation at this time.[64] In severe cases of psychosis, the family burden is crushing and could lead to serious health problems and isolation among the relatives.[65,66]

A limitation of the study is that all ratings were performed by the ordinary psychiatric staff. Meetings, including education and training in the assessment of rating scales, may partly compensate for this limitation, but risks of erroneous ratings cannot be overlooked.

Another limitation is that the structured treatment program of the Parachute Project may ameliorate the outcome for the included patients and therefore restrict the generalizability of the results. However, this limitation should be applicable to those patients with a favorable outcome and not those with a poor one.

A third limitation is that we have thus far applied our scale to the population from which it was derived and hence its validity remains untested. Therefore, the gener-

alizability of these findings to other samples of patients with first-episode psychosis is an open question at this time.

In this article, we have described a rating scale for the identification of patients with first-episode psychosis at risk of an unfavorable long-term outcome and thus in need of additional support and treatment. The scale, based on preadmission characteristics, may be a useful tool in a clinical context because it is easy to use, requires minimal training, and can easily be applied at first admission by psychiatric staff.

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