

A transcultural outcome study of adolescent eating disorders

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Objective: The aim of the study was to assess the treatment and outcome of adolescent eating disorders in an international study including Western and Eastern European clinical and research centres.

Method: A total of 138 patients with adolescent onset of an eating disorder (primarily anorexia nervosa) were followed-up after a mean interval of 5 years after first admission.

Results: On average, the patients had spent 25% of the total follow-up period in either in-patient or out-patient treatment. Half of them required a second hospitalization and a quarter required a third hospitalization for the eating disorder. At follow-up, 68% of the total sample did not have an eating disorder. The prediction of outcome revealed different patterns of risk variables depending on the type of criterion.

Conclusion: The outcome of adolescent eating disorders is relatively similar across cultures, and better than in patients with later onset of the disorder.

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Introduction

A recent review identified 108 outcome studies of anorexia nervosa that were published since the early 1950s, and a further 24 follow-up studies of bulimia nervosa (1). Due to the characteristic distribution of age at onset, anorexia nervosa follow-up studies have included patients with very early onset before puberty, early onset during adolescence, and adult onset, whereas bulimia nervosa outcome studies are typically based only on adult patients. It has been repeatedly argued that the outcome of adolescent anorexia nervosa is better than that for later onset of the disorder (2). However, a thorough test of this hypothesis has been hampered by various factors. First, many outcome studies are heterogeneous with regard to age at onset, and cover wide age ranges. Secondly, a small number of outcome studies based only on adolescent patients quite frequently share the methodological shortcomings of many outcome studies of eating disorders in general (i.e. limited sample size, lack of clear-cut diagnostic criteria,

indirect assessment of clinical status at follow-up, and insufficiently long follow-up periods) (1).

The present outcome study of adolescent eating disorders originated during the early 1980s in Berlin from studies by the senior author. It was later extended to Eastern European samples of patients from the period of profound social changes after the collapse of the socialist system. With the collaboration of further senior clinicians, it was possible to include additional patient samples from Sofia, Bulgaria (S.B.) and Bucharest, Romania (M.G.-S.).

The characteristics of the study are as follows. (i) The age range at onset was narrowly restricted to adolescence, and thus avoided age-related variations in the interpretation of the disease course. (ii) The resulting large sample size allowed rather robust findings. (iii) The composition of several samples from different social backgrounds and health systems allows a test of any potential transcultural impact on clinical phenomena, treatment and outcome of the eating disorders.

The present report addresses the following issues with regard to the course of the eating disorders: the amount of treatment that was given to the patients for their eating disorder during the entire follow-up period; the outcome in terms of the eating disorder and psychosocial functioning; the prediction of outcome by a large set of clinical variables.

Material and methods

Samples

All samples consisted of series of consecutively admitted patients who were initially seen between 1979 and 1988 in Berlin, between 1987 and 1993 in Sofia, and between 1984 and 1992 in Bucharest. All 156 patients fulfilled the ICD-10 criteria for the various forms of the eating disorders. Whereas all clinical diagnoses in the Berlin subsample were checked, and in the case of former ICD-9 diagnoses were re-analysed by two of the authors (H-C.S. and R.S.), all patients in the Sofia subsample were diagnosed by one examiner (S.B.), as were those in the Bucharest subsample (M.G.-S.). This included anorexia nervosa restrictive type (134 patients, 86%), anorexia nervosa with bulimic features (17 patients, 11%) and bulimia nervosa (5 patients, 3%). The distribution of diagnoses across the various subsamples did not show significant differences. Almost all of the patients were female (Berlin, 95%; Sofia, 93%; Bucharest, 100%).

As can be seen from the sample characteristics shown in Table 1, the age ranges were rather homogeneous, with only slight differences (i.e. lower age at admission for the Sofia sample compared to the Berlin sample (ANOVA with *post-hoc* Scheffé test $P < 0.05$) and lower age at onset for both the Sofia sample and the Bucharest samples compared to the Berlin sample (Scheffé test, $P < 0.001$ and $P < 0.05$, respectively). The body mass index (BMI, expressed

in kg/m^2) was substantially below the criterion value of 17.5 in all samples, as set by ICD-10 criteria. It was significantly lower in the Sofia sample than in the Berlin ($P = 0.01$) and Bucharest ($P < 0.01$) samples.

The entire cohort of 156 patients was invited for follow-up assessment. The drop-out rate at follow-up was acceptable in the West Berlin (10%) and Sofia (11.3%) samples, and was non-existent in the Bucharest sample. With a mean period of 5 years, all patients received extended follow-up. The duration of follow-up was significantly longer in the Bucharest sample than in the other two samples ($F = 10.72$, $df = 2$, $P < 0.001$). The mean age at follow-up was 20 years, with the Sofia sample being significantly younger than the Berlin and Bucharest samples ($F = 14.03$, $df = 2$, $P < 0.001$).

Procedure

All of the clinical data were collected prospectively on standardized item sheets that dealt with clinical symptoms and personal and family history. At follow-up all patients were directly interviewed by experienced clinicians who had, to a large extent, been involved in the treatment of the patients, so that the assessments benefited from a good rapport and a trusting relationship in order to buffer against false reports by the patients. The total amount of treatment was recorded for both in-patient and out-patient therapy. Admission and discharge dates were taken from hospital records, while onset dates and the dates of termination of out-patient treatment were recorded according to patient information at follow-up assessment. The total absolute duration of treatment and relative duration of treatment, taking the duration of follow-up into account, were calculated. The latter is a quotient and was converted into percentage values.

A semi-structured interview was conducted at follow-up that was modified (3) and requires the rating of topics that deal with symptoms of the eating disorders and psychosocial outcome. Each topic was rated on a 4-point scale reflecting the intensity or frequency of the respective item (absent, mild, moderate or severe) as described in the previous report on the Berlin sample (4). Five topics of the follow-up interview dealt with symptoms of the eating disorders, i.e. dieting, vomiting, bulimic episodes, laxative abuse and menstruation. These five items formed the eating disorders outcome score. Two additional topics addressed the attitude towards sexuality and active sexual behaviour, and the remaining four items assessed the quality of relationships with the patient's family of origin, the quality of social relationships in general, and their educational or

Table 1. Sample characteristics at the three sites of the study

	Berlin	Sofia	Bucharest	Total
Sample size at admission (<i>n</i>)	60	53	43	156
Mean age at admission (\pm SD) (years)	15.7 \pm 1.6	14.8 \pm 2.0	14.9 \pm 1.3	15.1 \pm 1.8
Mean age at onset (\pm SD) (years)	14.6 \pm 1.6	13.4 \pm 1.7	13.9 \pm 1.2	14.0 \pm 1.6
Mean body mass index at admission (\pm SD)	14.2 \pm 2.3	13.2 \pm 1.8	14.4 \pm 2.1	13.9 \pm 2.1
Sample size at follow-up (<i>n</i>)	50	47	41	138
Mean duration of follow-up (\pm SD) (years)	5.0 \pm 1.3	4.3 \pm 1.9	6.0 \pm 1.7	5.0 \pm 1.8
Mean age at follow-up (\pm SD) (years)	20.9 \pm 1.7	19.0 \pm 2.4	21.1 \pm 2.2	20.3 \pm 2.3

Table 2. Time spent in psychiatric treatment from onset to follow-up of the eating disorder

	Berlin (n=50)		Sofia (n=47)		Bucharest (n=41)		Total (n=138)	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Total amount of treatment								
In-patient treatment (days)	142.8	131.4	97.3	70.5	72.4	62.2	106.2	99.1
Out-patient treatment (months)	13.6	15.1	4.3	4.1	14.6	17.9	10.7	14.2
Quotient treatment duration by follow-up duration (%) ^a								
In-patient treatment	8	8	7	4	3	2	6	6
Out-patient treatment	24	27	12	12	18	22	18	22
Total treatment	33	29	18	14	22	22	25	23

^aFigures are rounded to the nearest decimal.

occupational status. From these six items a psychosocial outcome score was calculated. All 11 items served for the calculation of a total outcome score. With all three outcome scores a high score indicates a less favourable outcome. Furthermore, each interview ended with formal diagnoses at follow-up according to ICD-10 criteria.

All of the assessors were senior clinicians with expert knowledge of the eating disorders and extended training in both adolescent and adult psychopathology. All of the principal investigators were trained in data collection by the senior author. Statistical analyses included non-parametric analysis of variance (Kruskal–Wallis test), Chi-square tests or Fisher's exact test for low cell frequencies, Pearson correlation analyses and multiple regression analyses.

Results

Treatment for the eating disorders

Various parameters of treatment in terms of quantity and type of interventions were calculated. As Table 2 shows, the average patient stayed in the hospital for 106 days for psychiatric treatment from onset of the eating disorder to follow-up. ANOVA of these data showed statistically significant differences ($F=6.34$, $df=2$, $P=0.002$), with the Bucharest sample having received significantly less in-patient treatment ($P=0.003$). However, the Sofia patients received significantly less out-patient treatment ($F=7.96$, $df=2$, $P<0.001$) than the other two samples.

In order to obtain a clear impression of the total amount of time spent in treatment, we calculated the proportion of time spent in treatment during the total follow-up period expressed in percentages. According to the data presented in Table 2, at follow-up the average patient had spent 25% of his or her time in treatment since the onset of the disorder. However, the variation in each subsample, was huge, as indicated by the large standard deviations. There were significant differences for

the total amount of in-patient treatment ($\chi^2=17.22$, $df=2$, $P<0.001$) and the proportion of time spent in in-patient treatment during the follow-up period ($\chi^2=25.78$, $df=2$, $P<0.001$) and the total amount of out-patient treatment ($\chi^2=7.71$, $df=2$, $P=0.02$) across the three subsamples. The average proportion of time spent in in-patient treatment was 6%, and for out-patient treatment amounted to 18%. The figures for a second hospitalization due to the eating disorder were as follows: Berlin, 15 of 50 subjects (30%); Sofia, 34 of 47 (72%); Bucharest, 22 of 41 (54%); and 71 of 138 (51%) for the total sample. The respective figures for a third in-patient treatment due to the eating disorder were as follows: Berlin, 7 of 50 subjects (14%); Sofia, 14 of 47 (30%); Bucharest, 11 of 41 (27%); and 32 of 138 (23%) for the total sample.

The type of out-patient treatment showed large differences across sites. In Berlin, psychodynamic treatment ranked first (32%), followed by eclectic supportive psychotherapy (22%), family therapy (10%) and client-centred psychotherapy (2%). The Sofia sample was treated with supportive psychotherapy in 62% of cases and family therapy in 15% of cases, with very low frequencies of other interventions. Finally, the Bucharest treatment approach was dominated by drug treatment in 65% of cases, followed by client-centred psychotherapy in 9% of cases and some lower frequencies for other types of interventions.

Mortality

The total number of deceased patients was 7 (5.1%). Four patients came from the Berlin sample, one from Sofia and two from Bucharest. All of them died from direct or indirect consequences of the eating disorder, including suicide.

Eating disorders and psychosocial functioning at follow-up

The distribution of the BMI at admission and at follow-up is shown in Fig. 1. A minority of patients scored below the cut-off value of 17.5 for BMI at

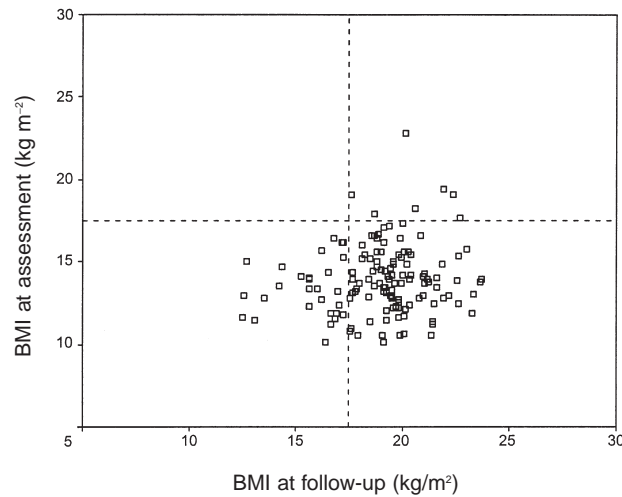


Fig. 1. The distribution of BMI at assessment and at follow-up. Dotted lines represent BMI = 17.5 kg/m², which represents the ICD criterion for pathology.

both assessments. However, the mean BMI (\pm SD) was clearly beyond the normal range of pathology for the total sample (19.1 ± 2.7) and for all three subsamples (Berlin, 19.3 ± 2.6 ; Sofia, 19.3 ± 1.9 ; Bucharest, 18.6 ± 3.4). There were no statistically significant differences between the samples when the means were compared. However, when calculating the normalization rate by applying the cut-off criterion of BMI ≥ 17.5 , there were significant differences between the three samples ($\chi^2 = 7.34$, $df = 2$, $P < 0.03$). The normalization rates were 79% for the total sample, and across the three subsamples they were as follows: Berlin, 80%; Sofia, 90%; Bucharest, 66%.

The follow-up interview findings are shown in Table 3. In total, 20% of the total sample of 138 patients still showed moderate to severe anorectic eating behaviour, less than 10% engaged in vomiting and bulimic behaviour, and very few (2%) abused laxatives. Among the various symptoms of anorexia nervosa, persistent menstrual anomalies were most frequent, (26% of the total sample). There were no significant differences between the

three cohorts with regard to the five symptom ratings of eating disorders.

Among the six psychosocial ratings at follow-up, avoidance of sexual behaviour was marked, with almost 50% of the patients receiving unfavourable ratings. This was mainly due to the even higher proportions of moderate and severe avoidance of sex among the two Eastern European sites compared to the Berlin sample ($\chi^2 = 15.27$, $P < 0.001$). This finding was matched by sexual attitudes that were also characterized by moderate to severe avoidance of sexual matters in 30% of the entire group of former patients. These tended to be negative attitudes more prominent in the two Eastern samples ($\chi^2 = 4.98$ $df = 2$, $P < 0.08$). A quarter of the entire follow-up group of patients had unsatisfactory family relationships, and there was an even higher rate among the Bucharest sample ($\chi^2 = 6.52$, $df = 2$, $P = 0.04$). There was a moderate to severe dependency on the family in 11% of the entire cohort, with a trend for higher proportions in the slightly younger Sofia cohort ($\chi^2 = 5.08$, $df = 2$, $P = 0.08$). On average, 17% had

Table 3. Items rated as moderate or severe at follow-up interviews in the three samples

Item	Berlin (n=50)		Sofia (n=47)		Buchares (n=41)		Total (n=138)	
	n	%	n	%	n	%	n	%
Anorectic eating behaviour	9	18	10	21	8	19	27	20
Vomiting	6	12	4	8	2	5	12	9
Bulimia	4	8	3	6	4	10	8	8
Laxative abuse	3	6	—	—	—	—	3	2
Amenorrhoea (n=133)	13	27	8	18	13	32	34	26
Avoidance of sexual matters	10	20	15	32	17	41	42	30
Avoidance of sexual behaviour	19	38	35	74	28	68	82	49
Unsatisfactory family relationships	9	18	9	19	16	39	34	25
Dependency on the family	3	6	9	19	3	7	15	11
Unsatisfactory social contacts	6	12	10	21	8	19	24	17
Impaired vocational or school career	5	10	6	13	11	17	22	16

Table 4. Eating disorders and psychosocial status at follow-up

Diagnosis	Berlin (n=50)		Sofia (n=47)		Bucharest (n=41)		Total (n=138)	
	n	%	n	%	n	%	n	%
Anorexia nervosa restrictive type	5	10	2	4	6	15	13	9
Anorexia nervosa bulimic type	2	4	1	2	3	7	6	4
Bulimia nervosa	0	0	2	4	—	—	2	1
Atypical anorexia nervosa	7	14	4	9	5	12	16	12
Atypical bulimia nervosa	2	4	0	0	3	7	5	4
Obesity	0	0	0	0	2	5	2	1
No eating disorder	34	68	38	81	22	54	94	68
No eating disorder and good psychosocial functioning	29	58	30	64	17	42	76	55

unsatisfactory social contacts, and 16% suffered from impaired vocational or school career. The latter finding tended to be more frequent among the Bucharest patients ($\chi^2=5.62$, $df=2$, $P=0.06$).

The distribution of eating disorders is shown in Table 4. At follow-up, on average 68% of the patients had no eating disorders according to ICD-10 criteria. The proportion is significantly different across sites ($\chi^2=7.46$, $df=2$, $P<0.03$), with the Bucharest sample faring worst and the Sofia sample showing the best results. Among the persistent eating disorders, atypical anorexia nervosa syndromes were most frequent, followed by anorexia nervosa (restrictive type), anorexia nervosa (bulimic type), atypical bulimia nervosa, bulimia nervosa and obesity. Cross-tabulation of type of eating disorders at intake and follow-up was hampered by the low frequencies of diagnoses other than anorexia nervosa (restrictive type) at intake. There was a tendency (not in a statistical sense) for anorexia nervosa (bulimic type) patients to more frequently have persistent eating disorders, and these disorders more frequently had some bulimic features. When the eating disorders outcome and the psychological outcome are combined, it becomes evident that on average only 55% have a positive combined outcome, with no significant differences across the three samples.

Prediction of outcome

Three criteria were chosen for the prediction of outcome, namely the BMI, the eating disorders outcome score and the total outcome score. Whereas a high BMI was indicative of normalization, a high score on the two composite scores indicated a less favourable outcome. On the basis of both the literature and, more specifically, the item sheet with all of the clinical data at intake, a set of potential predictors was defined. This set included four variables from the developmental history (premorbid eating disorders during the first year of life or later during childhood and adolescence; premorbid overweight; premorbid behavioural abnormalities), four variables from the family

history (anorexia nervosa or bulimia nervosa; any eating disorder, including obesity; other psychiatric disorder; family conflict or divorce), five clinical variables (age at onset; duration of symptoms before treatment; anorectic vs. other forms of the disorder; restrictor vs. purger type; BMI at admission) and four treatment and outcome variables (total duration of in-patient and out-patient treatment, respectively; rejection or premature termination of treatment; duration of follow-up).

Among the 51 (3×17) correlation coefficients, only 7 were significant, which is more than a simple chance finding. The results are shown in Table 5. The BMI at follow-up was positively predicted by two variables, namely premorbid overweight and BMI at admission. The eating disorders total score was significantly correlated with the following two variables: conflict or divorce in the family and purger type. Finally, the total outcome score significantly correlated with three variables, namely conflict or divorce in the family, BMI at admission (negative correlation) and total duration of out-patient treatment.

Subsequent multiple regression analyses attempted to identify the essential associations. For the BMI at follow-up, the two significant variables from the univariate analyses remained significant in the multiple correlation equation (i.e. the BMI at initial treatment and premorbid overweight). As with the univariate correlations, the total eating disorders score was predicted by family conflict and purging type. Finally, the total outcome score in the multiple correlation equation was predicted by only two variables only (i.e. family conflict and duration of out-patient treatment).

Discussion

This outcome study is deliberately based only on adolescent patients. Consequently, it consists mainly of anorexia nervosa patients because of the typical onset of the majority of all anorexic cases during early adolescence, whereas bulimia nervosa typically starts to become manifest at the end of

Table 5. Simple and multiple correlations with outcome scores

Predictor	Outcome criteria					
	BMI		Eating disorders score		Total outcome score	
	<i>r</i>	β^a	<i>r</i>	β^a	<i>r</i>	β^a
Premorbid overweight	0.23**	0.18				
Family conflict			0.31***	0.27	0.30***	0.34
Purging type			0.17*	0.22		
BMI at admission	0.31***	0.28			-0.19*	
Duration of out-patient treatment					0.19*	0.30
Multiple <i>r</i>		0.36		0.38		0.44
r^2		0.13		0.14		0.19

^a Standardized coefficients.

* $P < 0.05$, ** $P < 0.01$, *** $P < 0.001$.

adolescence or during young adulthood. Both the age range and the composition of the sample have to be considered in relation to the conclusions that can be drawn from the findings of this study. Clearly, generalizability is limited for the outcome at the time of follow-up, which was young adulthood in the present study, after a mean follow-up period of 5 years. Furthermore, the follow-up assessments were not performed by independent assessors, but by expert clinicians who had been responsible for the patients at least at the time of the first admission. However, it was felt that this is an asset of the study rather than a flaw, because personal knowledge of the patient should increase the reliability of information, especially in the case of individuals who tend to withhold relevant information, as is frequently true of eating-disordered patients.

Among the various findings, for the first time in outcome studies on eating disorders the present investigation has provided a systematic assessment of treatment efforts. The findings not only reflect the varying resources and types of treatment given to the patients at the various sites, but also the seriousness and chronicity of the eating disorders in many patients. On average, patients received either in-patient or out-patient treatment for 25% of the follow-up period. This is a remarkable figure both in terms of professional involvement and in terms of costs. In the total sample, one in two patients required a second hospital admission, and almost one in four patients needed a third hospitalization during the follow-up period. The treatments provided at the various sites, especially for the out-patients, showed marked transcultural variations. They reflect not only various psychiatric treatment cultures, with a certain emphasis on psychodynamic out-patient treatment in the Berlin sample and drug treatment for the Bucharest patients, but also the lack of acceptance and compliance with psychotherapy in the Bucharest patients.

In the present study the outcome at follow-up was studied with regard to several parameters. First, it was found that the mortality rate (5.1%) was very close to the average figure of 5.5% (range 0–21%) in the analysis of 108 outcome studies on anorexia nervosa (1). Secondly, the normalization rate of the BMI was rather good for the total sample, although there were clear variations within the subsamples and across study sites. Thirdly and similarly, the recovery rates from the eating disorders was also quite favourable in that on average 68% of the patients no longer qualified for the diagnosis of an eating disorder. A similar recovery rate of 76% in former adolescent anorexic patients was found in the most recent outcome study by Strober et al. (5). The findings of these two studies are better than those reported in other outcome studies published to date. On average, only 51% of the adolescent anorexic patients and 43% of all anorexic patients irrespective of age at onset had a good outcome in terms of recovery from the eating disorder (1). Fourthly, there was significant transcultural variation in outcome with regard to the frequency of eating disorders. The poorest outcomes with regard to eating disorders were seen in the subsample from Bucharest. These outcomes might be associated with the predominance of out-patient drug treatment in the Bucharest sample, and the evidence from other studies that drug treatment has no central role in the treatment of adolescent anorexia nervosa (6).

In contrast to the relatively benign outcome of the eating disorders, the psychosocial functioning of the patients was affected more adversely. Sexual behaviour in particular, terms of pleasure in sexual relationships and positive sexual attitudes, was quite frequently impaired. This was particularly true for the two Eastern European samples, perhaps reflecting the more conservative sexual attitudes in their societies. Again it was the Bucharest sample that had the highest frequency of patients with

impaired psychosocial functioning. However, the findings with regard to psychosocial functioning may be biased by culture, and would certainly benefit from comparisons with matched controls from the respective cultures.

Finally, an attempt was made to analyse all of the relevant predictors of outcome that have been studied sporadically but not systematically in previous studies. With the use of three different outcome criteria and 17 potential prognostic indices, a relatively simple pattern emerged of associations on univariate levels. In general, these correlations were low to moderate. The various associations clearly show that one finds different predictors depending on the criterion. Furthermore, our findings support the conclusion in the recent outcome study by Strober et al. (5) that predictive associations are time-dependent and differ with respect to the outcome criterion of interest. The present findings are also consistent with the analysis of the eating disorders outcome studies in the literature, indicating large variations in prognostic indicators across studies (1). Clearly our findings are not related to differences in the duration of follow-up.

With a multivariate procedure of data analysis that takes shared variance into account, these complex relations remained rather similar. The BMI at follow-up continued to be predicted by premorbid weight and BMI at intake. A similar finding with regard to the relevance of the BMI at intake was also reported in a recent multicentre study that included some of our data (7). Furthermore, as on the univariate level, with the multivariate analyses the eating disorders outcome was again predicted by family conflict and purging type. For the total outcome score, which takes into account both the eating pathology and the poor psychosocial development, it was family conflict and the duration of out-patient treatment that remained the significant predictors. This finding points to the strong environmental impact that the family may have on the course of adolescent eating disorders, and to the relatively ineffective out-patient treatment efforts in chronic patients. However, one should not overlook the fact that the amount of explained variance in each multiple correlation analysis was moderate to low. Thus one has to conclude that prediction, even using a large list of indices and a large sample, currently results in

very low prognostic power, and is certainly not feasible for the individual clinical patient.

In summary, the main clinical implications are as follows. (i) The outcome of adolescent eating disorders is relatively similar across cultures with regard to the main features of the illness. Psychosocial functioning in relation to outcome differs according to the varying cultural background. (ii) The patients spend a considerable proportion of their lifetime in treatment. (iii) The younger age at onset of the disorder carries a better prognosis. (iv) The joint consideration of a large list of potential clinical features shows that very few have a significant predictive value, so that the prognosis for an individual patient is most problematic. The limitations include a lack of information on other psychiatric disorders at follow-up, which was not available for all three patient cohorts. Preliminary data indicate that the inclusion of other or coexisting psychiatric disorders implies a less favourable outcome. Furthermore, a more detailed assessment could be obtained if additional information provided by the relatives of the patients could have been included.

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