

## Loss to follow-up in longitudinal psychiatric research

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**SUMMARY.** **Aims** – To analyse factors that differentiate patients who attend follow-up assessments versus those who do not, and to identify predictors for drop-out within the context of the European Day Hospital Evaluation Study (EDEN-Study). **Methods** – The EDEN-Study, a multi-center RCT comparing acute psychiatric day care with inpatient care, required re-assessment of patients at discharge, 3 and 12 months after discharge. Follow-up rates varied between 54.0% and 99.5%. Socio-demographic and clinical characteristics of patients who did and did not attend follow-up were analysed using uni- and multivariate statistical methods. **Results** – Univariate analyses showed differences between patients regarding study site, treatment setting, living situation, employment, age, psychopathological symptoms and treatment satisfaction. They were not confirmed in multivariate analyses thus meaningful predictors of drop-out could not be identified. **Conclusions** – Results emphasize the general need to compare patients re-assessed and not re-assessed in terms of their most relevant socio-demographic and clinical variables to assess the generalizability of results.

**Declaration of Interest:** EDEN (Psychiatric day hospital treatment: An alternative to inpatient treatment, being cost-effective and minimizing post-treatment needs for care? An evaluative study in European countries with different care systems) was funded by the European Commission (Quality of Life and Management of Living Resources Programme: QLG4-CT-2000-01700). Additional national grants supporting the project were provided by Roland-Ernst-Stiftung für Gesundheitswesen and the Faculty of Medicine at the Dresden University of Technology, the National Health Service Executive Organization and Management Programme, the Polish National Committee of Scientific Affairs, and the Slovak Ministry of Education. Pfizer Pharmaceutical Company supported travel and accommodation for EDEN project meetings.

**KEY WORDS:** loss to follow-up, predictors, randomized controlled trial, acute psychiatric day care.

Received 6.11.2007 – Final version received 10.01.2008 – Accepted on 12.01.2008.

### INTRODUCTION

Loss of study participants to follow-up assessments is an ever present problem in longitudinal clinical research, even if assiduous follow-up procedures are applied. When drop-outs occur systematically study findings can be severely biased thus generalizability of results is questionable.

Concerning the extent of reported follow-up rates, studies demonstrated considerable differences across several research projects. In general, follow-up-rates of 80% or higher were considered as satisfactory (Desmond *et al.*, 1995). However, achieved rates often did not exceed a range of 30 to 80% (Fischer *et al.*, 2001).

Previous research how and the degree to which samples were biased because of attrition yielded contradictory statements, either confirming the conclusion that drop-out is non-systematic (Goering *et al.*, 1984; Kosten *et al.*, 1992; McGlashan, 1984), or supporting the hypothesis that loss to follow-up occurs in a systematic way, thus biasing findings (Badawi *et al.*, 1999; Eaton *et al.*, 1992; Farmer *et al.*, 2001; Jay *et al.*, 1993; Mihelic & Crimmins, 1997).

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Increasing the knowledge about characteristics of patients at high risk for not participating in follow-up assessments could help to develop effective strategies for minimizing loss to follow-up in future studies (Siddiqui *et al.*, 1996).

The *European Day Hospital Evaluation* (acronym: EDEN-study), a European multi-center randomized controlled trial on comparing the effectiveness of acute psychiatric day care and conventional inpatient care (Kallert *et al.*, 2002a; 2004a), demonstrated that acute day care was as effective as conventional inpatient care with respect to psychopathological symptoms, quality of life, and satisfaction with treatment. It was more effective on social functioning at discharge, and three and twelve months after discharge (Kallert *et al.*, 2007). However, as expected from longitudinal studies, the EDEN-study encountered losses of patients within the defined follow-up periods, e.g. because of withdrawal of the initially provided informed consent or due to patient relocation.

In this paper, we want to analyse the extent of drop-out in a psychiatric sample at the defined follow-up time points as well as socio-demographic and clinical characteristics discriminating between patients re-assessed and not re-assessed. With five study-centers in different European countries (Germany, Great Britain, Poland, Slovak Republic and Czech Republic) as well as three different follow-up time-points (at discharge, 3 and 12 month after discharge) we can examine if there are recurring patterns of patient characteristics which are associated with drop-out under resembling conditions. In a second step, we want to examine if there are patient-related features that can be used as reliable predictors for non-participation in follow-up assessments. Findings could help to develop effective strategies to minimize drop-out in prospective psychiatric research.

## METHOD

### Research Context

Present research is based on data of the EDEN-study, which was collected in five psychiatric hospitals in five European countries: Dresden (Germany), London (UK), Wrocław (Poland), Michalovce (Slovak Republic), and Prague (Czech Republic). The catchment areas as well as the participating study centers showed some significant differences related to economic resources and regional mental health service systems, in terms of structural and organizational features of the clinical settings. While the psychiatric hospitals in Dresden, Prague, and Wrocław

are located in higher income areas of large cities, the participating hospital in East London is located in a multi-ethnic and economically deprived borough. In contrast, the hospital in Michalovce is located in a rural area. According to the *International Classification of Mental Health Care* (ICMHC; de Jong, 2000) day hospitals were similar across centers in both the type of interventions provided and their respective level of specialization, inpatient wards differed by staffing levels (Kallert *et al.*, 2007). Details of the individual study centers, the study design, the randomization process, and the effectiveness results related to the most important clinical outcome domains have been reported elsewhere (Kallert *et al.*, 2002; 2004a; 2007).

### Sample, Data Collection and Survey Instruments

Within the EDEN-study, a total of  $N = 1117$  patients were randomly assigned to acute day care or inpatient care. Of these patients, 1055 received the treatment to which they had been randomly allocated.

Patients were interviewed by trained researchers not involved in the treatment process at the following time-points: within three days of hospital admission, at discharge, three and 12 months after discharge.

Following the first interview, each patient received written information about all interview appointments. Furthermore, patients were asked to inform interviewers about their date of discharge. In addition, members of the research teams made daily phone calls to the participating clinical settings to obtain accurate updates on clinical decisions regarding the discharge of patients. Discharge interviews were normally conducted at the day of discharge. Before discharge, patients received a written schedule listing the dates of the follow-up interviews three and twelve months after discharge. One to two weeks before the scheduled follow-up assessments patients were contacted by phone or by mail to arrange a convenient date for the interview. The follow-up interviews were usually conducted either in the offices of the researchers in the hospital or at the patients' homes. For participating in the follow-up assessments patients received a fee of approximately 10 €.

Analyses in this paper are based on data collected with the following survey instruments:

- 1) *Client Socio-Demographic and Clinical History Inventory* (CSCHI; Kallert *et al.*, 2000) for standardized assessment of socio-demographic features as well as for the clinical history and diagnoses of patients.

- 2) *Brief Psychiatric Rating Scale* (BPRS 24-item version 4.0; Schützwohl *et al.*, 2003; Ventura *et al.*, 2003) for the assessment of the severity of psychopathological symptoms. The rating scale of this instrument for each symptom ranged from “1” (“not present”) to “7” (“extremely severe”).
- 3) *Client Assessment of Treatment* (CAT; Priebe *et al.*, 1995) for the assessment of the patient’s satisfaction with treatment. The ratings of the seven Likert Scales for individual aspects of treatment ranged from “0” (“very unpleasant or very unsatisfied”) to “10” (“very pleasant or very satisfied”). Information received in the four open questions of the CAT was not analysed for this paper (Eichler *et al.*, 2006).

### Statistical Analysis

The first analysis tested for significant differences related to various socio-demographic data and clinical ratings at admission to index-hospitalization between the groups of patients re-assessed and not re-assessed at the three selected time-points of assessment. Analysis of the data collected three and twelve months after discharge is restricted to the data sets of those patients who could have been assessed at discharge, in order to include the data from the discharge assessment in the analysis of predictors for participating in follow-up interviews after discharge. For these analyses univariate tests ( $\chi^2$ -Test, exact Fisher-Test resp. Fisher-Freeman-Halton-Test, and t-Test) were used and applied a) to the total study population, and b) to the samples in each of the five centers. Because analyses were explorative, alpha adjustment was not applied. Following variables were included in these analyses: gender, age, employment status (employed/in employment training vs. unemployed/pensioned/stay-at-home-mother), level of education (university degree achieved: yes vs. no), living situation (living alone vs. not living alone), main ICD-10 clinical diagnosis, first manifestation of the disorder, duration of the index-hospitalization, psychopathological symptomatology (BPRS) at admission and discharge, satisfaction with treatment

(CAT) at admission and discharge, and treatment setting (day hospital vs. inpatient ward). Analysis of the total study population also included a variable representing the individual study sites (Dresden, London, Wrocław, Michalovce, and Prague). Because patients with a main clinical F10-F19 diagnosis (mental and behavioral disorders due to psychoactive substance use) had been excluded from the EDEN study, a co-morbid F10-F19 diagnosis was included as an additional variable.

The second stage of analysis used binary logistic regression analysis (simultaneous entry of data) at the multivariate level to determine whether those features that had shown significant differences in the univariate tests between patients re-assessed and not re-assessed contributed independently to the prediction of loss to follow-up.

### RESULTS

In general, the follow-up rates achieved (Table I) were considered very satisfactory, ranging between 68% and 87% for the total study population. For the four centers in Dresden, Wrocław, Michalovce, and Prague, rates varied from 68% to 99.5%. The London site could only achieve follow-up rates ranging between 54% and 68%, however. Furthermore, it should be noted that the research team in this site was able to interview fewer patients at the time of discharge than at the time-point three months after discharge.

As the flowchart of data collection (Figure 1) illustrates, missing data referring to at least one of the selected predictor variables prevented the use of all data sets collected at admission and the follow-up interviews. There were some significant differences between the groups with complete and incomplete data sets: younger-aged and male patients yield more often missing data that impeded further analysis (data available on request).

Table II summarizes the data on age, gender, living situation, employment status, treatment setting, and main ICD-10 clinical diagnoses for the total study population as well as for the samples at the individual participating centers at admission and discharge respectively.

Table I. – Follow-up rates within the EDEN-study.

	Total study population	Dresden	London	Wrocław	Michalovce	Prague
Admission to index-hospitalization	N = 1055	N = 191	N = 207	N = 238	N = 213	N = 206
Follow-up at discharge from index-hospitalization	918 (87%)	179 (94%)	112 (54%)	213 (89%)	212 (99.5%)	202 (98%)
Follow-up 3 months after discharge	807 (76%)	153 (80%)	140 (68%)	179 (75%)	166 (78%)	169 (82%)
Follow-up at discharge and 3 months after discharge	753 (71%)	149 (78%)	92 (44%)	177 (74%)	166 (78%)	169 (82%)
Follow-up 12 month after discharge	718 (68%)	135 (71%)	117 (57%)	163 (68%)	151 (71%)	152 (74%)
Follow-up at discharge and 12 month after discharge	665 (63%)	131 (69%)	70 (34%)	161 (68%)	151 (71%)	152 (74%)

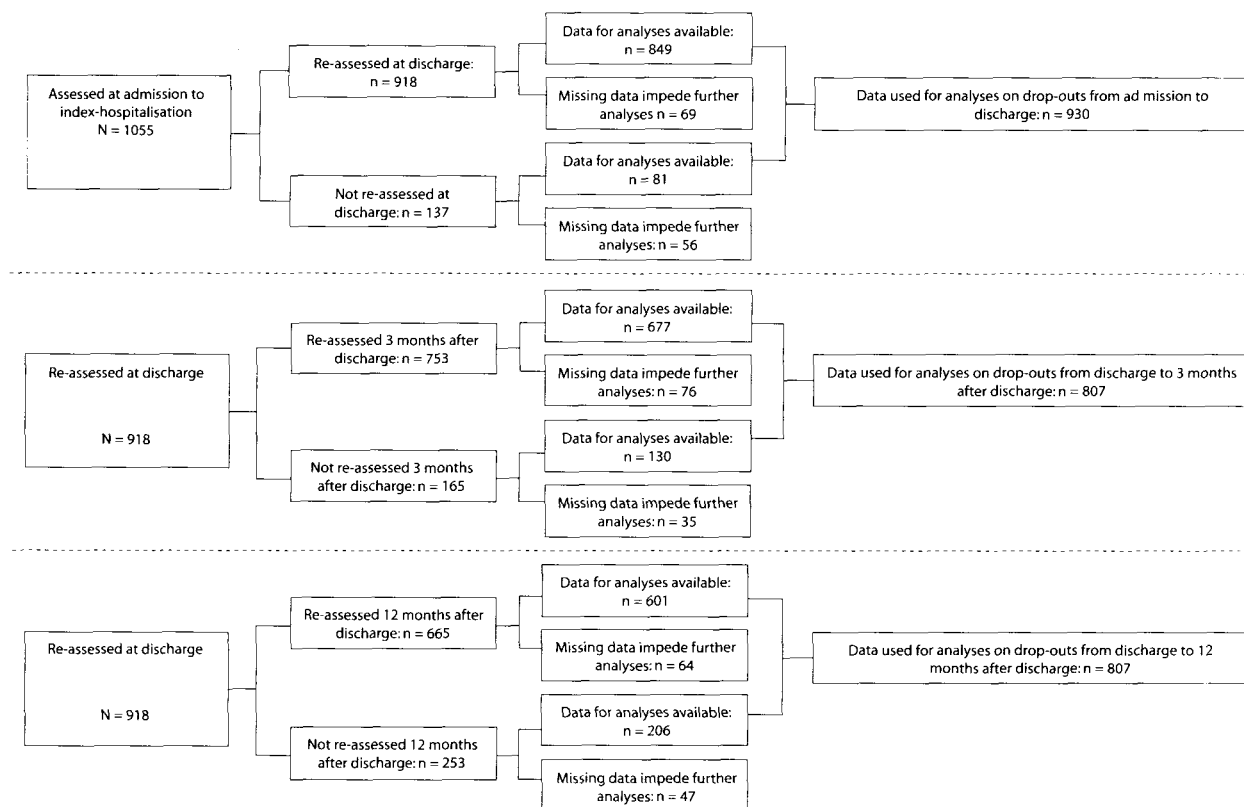


Figure 1. – Flow of data sets through time-points of assessment.

### Differentiating Factors (Total Sample)

Results of univariate analysis for the total study population at discharge demonstrate that re-assessed patients differed significantly from patients not re-assessed in six of the 13 variables tested (Table III shows all significant results). Patients who did not show up for the discharge interview are characterized as more frequently living alone, not being employed, of younger age, with more severe psychopathological symptoms at admission, and by a higher degree of initial dissatisfaction with treatment. For the general research design of this multi-site study, a highly significant difference between the study centers at this time-point is of major importance. The rate of patients lost at this follow-up time-point in London was much higher than in the other centers.

At the assessment three months after discharge, no significant differences between the two groups appeared among the tested variables.

At the assessment twelve months after discharge, only two significant differences were identified: the group of patients lost to follow-up had been more frequently treated on inpatient wards, and they had shown more severe psychopathological symptoms at discharge (Table III).

### Differentiating Factors (Individual Study Centers)

At the level of the individual centers, only a few significant differences between patients re-assessed and not re-assessed could be identified. At discharge, significant differences between the two groups existed only in the Dresden and Wroclaw samples. In Dresden, patients living alone attended the discharge interview less frequently ( $df = 1, n = 178, p = .042, \phi = -.172$ ). In Wroclaw, the two groups differed by: a) diagnosis: patients with affective disorders showed up more frequently for the discharge interview compared to patients with personality disorders



Table II. – Description of the EDEN-study population at admission and discharge.

	Total study population		Dresden		London		Wroclaw		Michalovce		Prague	
	admission n = 1055	discharge n = 930	admission n = 191	discharge n = 178	admission n = 207	discharge n = 129	admission n = 238	discharge n = 231	admission n = 213	discharge n = 199	admission n = 206	discharge n = 193
Gender (female)	631 (60)	574 (62)	130 (68)	122 (69)	106 (51)	73 (57)	163 (68)	159 (69)	107 (50)	101 (51)	125 (60)	119 (62)
Age at admission	39.0 (12.0)	39.3 (12.1)	37.7 (11.9)	37.5 (11.9)	36.7 (11.1)	38.1 (11.8)	42.0 (10.9)	42.0 (10.9)	39.1 (10.7)	39.3 (10.7)	38.7 (14.4)	38.8 (14.3)
Living situation (living alone)	198 (19)	163 (18)	55 (29)	52 (29)	73 (35)	42 (33)	30 (13)	30 (13)	11 (5)	11 (6)	29 (14)	28 (15)
Employment status (currently employed or in employed training)	383 (36)	359 (39)	104 (54)	98 (55)	46 (22)	33 (26)	51 (21)	47 (20)	71 (33)	66 (33)	122 (59)	115 (60)
Treatment setting (acute day hospital)	557 (53)	483 (52)	92 (48)	85 (48)	142 (69)	96 (74)	115 (48)	111 (48)	104 (49)	96 (48)	101 (49)	95 (49)
Main clinical ICD-10 diagnosis												
F20-29	258 (24)	223 (24)	28 (15)	27 (15)	42 (20)	21 (16)	95 (40)	92 (40)	59 (28)	59 (30)	25 (12)	24 (12)
F30-39	387 (37)	348 (37)	93 (49)	85 (48)	81 (39)	65 (50)	92 (39)	89 (39)	43 (20)	38 (19)	74 (36)	71 (37)
F40-49	206 (20)	193 (21)	37 (19)	34 (19)	22 (11)	18 (14)	34 (14)	34 (15)	59 (28)	57 (29)	53 (25)	50 (26)
F60-69	89 (8)	80 (9)	24 (13)	23 (13)	20 (10)	17 (13)	6 (3)	6 (3)	22 (10)	21 (11)	15 (7)	13 (7)
Other diagnoses	88 (8)	86 (9)	9 (5)	9 (5)	10 (5)	8 (6)	10 (4)	10 (4)	24 (11)	24 (12)	35 (17)	35 (18)

Data are given as n (%) except for 'age at admission' where mean (standard deviation) is given.

F20-29 = Schizophrenia, schizotypal and delusional disorders

F30-39 = Mood (affective) disorders

F40-49 = Neurotic, stress-related and somatoform disorders

F60-69 = Disorders of adult personality and behaviour

Table III. – Group differences between patients re-assessed and not re-assessed for the total study population and predictive variables of loss to follow-up at discharge and one year after discharge.

	Group differences at discharge <sup>1</sup>		Predictive variables of loss to follow-up at discharge (n=930)		
	Re-assessed (n = 849)	Not re-assessed (n = 81)	P	OR	(95%-CI)
<b>STUDY CENTER</b>			<b>.000</b>		
Dresden	166 (20%)	12 (15%)		1.00	–
London	88 (10%)	41 (51%)		5.46	(2.50-11.96)
Wroclaw	208 (24%)	23 (28%)		1.53	(0.68-3.45)
Michalovce	198 (23%)	1 (1%)		0.06	(0.01-0.45)
Prague	189 (22%)	4 (5%)		0.27	(0.08-0.91)
Living situation (living alone = 1)	135 (16%)	28 (35%)	<b>.000</b>	1.70	(0.94-3.08)
Employment status (currently employed or in employment training = 1)	342 (40%)	17 (21%)	<b>.001</b>	0.43	(0.22-0.82)
Age at admission			<b>.008</b>		
18-25 years	147 (17%)	17 (21%)		1.00	–
26-40 years	268 (32%)	37 (46%)		0.83	(0.40-1.71)
41-65 years	434 (51%)	27 (33%)		0.47	(0.21-1.05)
BPRS 24-Item-mean scale score at admission <sup>2</sup>	1.94 ± 0.41	2.10 ± 0.46	<b>.001</b>	1.03	(0.55-1.95)
CAT mean scale score at admission <sup>3</sup>	7.62 ± 1.84	6.77 ± 2.00	<b>.000</b>	0.89	(0.77-1.01)
	Group differences 12 months after discharge <sup>1</sup> (n = 206)			Predictive variables of loss to follow-up 12 month after discharge (n = 807)	
Treatment setting (acute day hospital)	327 (54%)	93 (45%)	<b>.022</b>	0.65	(0.46-0.93)
BPRS 24-Item-mean scale score at discharge <sup>2</sup>	1.45 ± 0.31	1.52 ± 0.34	<b>.010</b>	2.18	(1.22-3.90)

<sup>1</sup>χ<sup>2</sup>-Test, Fisher's exact test, Fisher-Freeman-Halton-Test and t-Test.

<sup>2</sup>The rating scale for each item on the BPRS ranged from 1 ("not present") to 7 ("extremely severe").

<sup>3</sup>The rating scale for each item on the CAT ranged from 0 ("not at all satisfied") to 10 ("yes, entirely satisfied").

(df = 4, n = 231, p = .048, phi = -.085); b) duration of treatment: patients with a brief treatment period (0 – 14 days) missed the discharge interview more frequently (df = 3, n = 231, p = .001, phi = .313); and c) satisfaction with treatment: patients who had been dissatisfied with their treatment at admission (CAT) attended the discharge interview less frequently (mean = 6.44, SD = 2.12 vs. mean = 7.57, SD = 1.73; t (229) = 2.92, p = .004; d = .383).

For the assessment three months after discharge, again only the Dresden and Wroclaw sites showed significant differences between the two groups. In Dresden, patients who had been less satisfied with their treatment at discharge (CAT) were more frequently lost to follow-up (mean = 7.11, SD = 1.77 vs. mean = 7.92, SD = 1.67; t (154) = 2.20; p = .029; d = .615). In Wroclaw, patients with shorter-term index-hospitalizations missed the three-months follow-up interview more frequently (df = 3, n = 199, p = .018, phi = .140).

Finally, twelve months after discharge the group of patients re-assessed differed significantly from the group not re-assessed in the Dresden and London sites. In both sites, patients who had been treated in the day hospital setting attended the one-year follow-up interview more frequently (Dresden:  $\chi^2$  (1, n = 156) = 6.35, p = .012, phi = .202; London:  $\chi^2$  (1, n = 82) = 5.57, p = .018, phi = .261). Differences related to diagnosis also appeared. In Dresden, patients with affective disorders and neurotic, stress-related and somatoform disorders more frequently kept their follow-up appointments, whereas patients with schizophrenia, schizotypal or delusional disorders and patients with disorders of adult personality and behavior were overrepresented in the group of patients lost at this time-point ( $\chi^2$  (4, n = 156) = 9.69, p = .046, phi = .118). In contrast, patients with schizophrenia or schizoaffective disorders and patients with adult personality or behavioral disorders at the London site participated more frequently in this follow-up interview compared to patients with neurotic, stress-related and somatoform disorders (df = 4, n = 82, p = .030, phi = -.193). In addition, patients at the London site who had been less satisfied with their treatment at the time-point of admission (CAT), appeared less frequently for the one-year follow-up assessment (mean = 6.49, SD = 2.09 vs. mean = 7.68, SD = 2.25; t (80) = 2.29; p = .025; d = .979).

### Predictors of Drop-out

To predict drop-out in the total study population, we tested the following variables at multivariate level using binary logistic regression: a) all variables which had

shown statistically significant differences between patients re-assessed and not re-assessed (total sample) in univariate analyses (study center, living situation, employment status, age at admission, treatment setting, ICD-10 diagnosis, psychopathological symptomatology (BPRS) at admission and discharge, and satisfaction with treatment (CAT) at admission and discharge) b) gender and achieved level of education, because several studies had reported significant differences in these variables comparing re-assessed and not re-assessed patients (Badawi *et al.*, 1999; van Beijsterveldt *et al.*, 2002; Eaton *et al.*, 1992; Edwards *et al.*, 2007; Fischer *et al.*, 2001; Siddiqui *et al.*, 1996) and c) duration of index-hospitalization because of the EDEN-study design.

For the time-point of discharge from index-hospitalization, two predictors were entered into the regression model (Table III). The individual study center played the most important role. Compared to Dresden, the probability for loss to follow-up appeared to be significantly increased in London (OR = 5.46) and significantly decreased in Michalovce and Prague (OR = 0.06, OR = 0.27 respectively). For the variable of employment status, the probability for loss to follow-up was less in patients who had been employed or in employment training (OR = 0.43).

For the time-point three months after discharge no significant predictor of loss to follow-up was found.

For the time-point twelve months after discharge, only two predictors could be identified (Table III): treatment setting (patients who had been treated in the day hospital setting were less likely to be lost to follow-up (OR = 0.65)), and psychopathological symptomatology at discharge (patients whose psychopathological symptoms were more severe at discharge showed a higher probability for loss to follow-up (OR = 2.18)).

It should be emphasized, however, that none of the three statistical models exhibited a satisfactory explanation of variance (discharge: Nagelkerkes  $R^2$  = 0.30;  $\chi^2$  (20, n = 930) = 135.47; p = .000; three months after discharge:  $R^2$  = 0.04;  $\chi^2$  (22, n = 807) = 18.29; p = .689; twelve months after discharge  $R^2$  = 0.06;  $\chi^2$  (22, n = 807) = 53.82; p = .032).

### DISCUSSION

Because the EDEN-study had defined a range of specific inclusion and exclusion criteria applied in the recruitment of patients (Kallert *et al.*, 2002a) the results of the study are only generalizable to patients cared for in general psychiatric day hospitals (Kallert & Schützwohl, 2002b; Kallert *et al.*, 2004b). For example, patients older

than 65, patients with a main clinical diagnosis of mental and behavioral disorder due to psychoactive substance use or patients with a significant suicide risk were excluded. These definitions might at least partially explain the results that are contradictory to other studies assessing follow-up problems in psychiatric clientele which had included older persons (van Beijsterveldt *et al.*, 2002; Jay *et al.*, 1993; Mihelic & Crimmins, 1997) or patients with alcohol or drug addiction (Kosten *et al.*, 1992). Another limitation comes from the relatively high proportion of patients who had to be excluded from our analyses because of missing data for the selected predictor variables. Although the statistical evidence is not extremely strong, younger-aged and male patients appear to be the sub-population of the EDEN-study most likely to yield incomplete data. Thus, reported results on variables relevant for loss to follow-up might be slightly biased in terms of age and gender. Besides the group of patients who did not attend follow-up interviews was in parts rather small (e.g. at the study sites of Michalovce and Prague at discharge) which might have caused inconsistent results across the study centers and follow-up time points as well as impeded the extraction of predictors for loss to follow-up. With these limitations in mind, we offer the following reflections on our results.

In terms of overall rates of follow-up, the four study sites in Dresden, Wroclaw, Michalovce and Prague achieved very satisfactory results ranging between 68.0% and 99.5%. This shows that the follow-up procedures applied in EDEN-study were very successful under the given conditions in these study centers regardless of the specific organization of psychiatric services and different types of care *after* discharge in those countries. In contrast the follow-up rates in London, in particular for the discharge assessment (54%) showed some rather high loss to follow-up. The reasons might be mainly traced to organizational problems associated with conducting the study. The research staff in London fluctuated quite often, thus the cooperation between the researchers, clinical staff and patients was repeatedly interrupted. As the study documentation in this center showed, some patients had been discharged unexpectedly without the research team being informed by the clinical staff; some patients had discharged themselves or had not returned to the hospital after an approved leave from the index-treatment period; other patients had been discharged because of non-attendance at the day hospital (Priebe *et al.*, 2006.) According to catchment-area specific data collected with the *European Service Mapping Schedule* (ESMS Version 3; Johnson *et al.*, 1997) only the London area provided a broad community-oriented mental health services for

care *after* discharge (Kallert *et al.*, 2005). After discharge patients could easily change to other services which may have impeded the attendance of patients in follow-up interviews as well.

Trans-cultural differences may have contributed to the varying follow-up rates in the study centers. At project meetings the impression emerged among research staff that patients in Eastern European countries (especially in Prague and Michalovce) might have felt stronger commitment to attend follow-up interviews once they agreed to participate in the study than the patients from the hospital in London whose catchment area comprised a multi-ethnic (41% ethnic minorities) and economically deprived borough.

Although generally these rather high drop-out rates in London could be viewed as problematic, the groups of patients re-assessed and not re-assessed in this site showed no major differences for all three time-points of assessments, i.e. no drop-out bias could be detected. Furthermore, previous literature does not suggest lower follow-up rates (of 30% to 80%) as being problematic in other research scenarios (Desmond *et al.*, 1995).

Within the total study population, most differences between re-assessed and not re-assessed patients appeared at the time-point of discharge from the index-treatment episode. Patients who could not be followed-up lived more frequently alone, were more frequently unemployed/received (disability) pensions/worked in the household, were younger, and had shown higher levels of psychopathological impairment and dissatisfaction with their treatment at admission. At the assessment three months after discharge, there were no differences between patients re-assessed and those not re-assessed. One year after discharge, only two variables showed significant differences: patients who could not be followed-up had been more frequently treated on inpatient wards, and their psychopathological symptoms at discharge had shown a higher level of impairment.

Within individual centers, only three of the sites showed differences between patients re-assessed and not re-assessed: Dresden (all three follow-up time-points), Wroclaw (discharge and three-months follow-up) and London (twelve-months follow-up). These differences appeared only at rather low levels of statistical significance for the variables of living situation, main clinical diagnosis, and treatment setting. Statistical significance was much higher for differences in duration of index-hospitalization, and in treatment satisfaction at admission and discharge. Since these differences were inconsistent and unsystematic across follow-up time-points as well as study centers, results do not allow reasonable interpreta-



tion with respect to the individual characteristics of the study centers.

In summary, the results of univariate analyses show that patients who were less socially integrated (living alone, being unemployed), less satisfied with their treatment and stronger psychopathological impaired dropped-out more frequently. These patients might have felt less commitment to attend the follow-up interviews. Findings are consistent with those established in previous studies (Badawi *et al.*, 1999; Fischer *et al.*, 2001; Mihelic & Crimmins, 1997). Concerning the age of the patients, our finding that younger patients belonged more often to the group of drop-outs is consistent with some previous results in the literature (Edwards *et al.*, 2007) but not others. In some studies (Eaton *et al.*, 1992; Mihelic & Crimmins, 1997) the risk for loss to follow-up seemed to be higher for older patients, whereas other studies have not found any age difference (Badawi *et al.*, 1999; van Beijsterveldt *et al.*, 2002; Siddiqui *et al.*, 1996). Variables such as gender, level of education or substance abuse that made significant differences in other studies (van Beijsterveldt *et al.*, 2002; Eaton *et al.*, 1992; Edwards *et al.*, 2007; Fischer *et al.*, 2001; Siddiqui *et al.*, 1996; Jay *et al.*, 1993;) were not relevant in our study. Differences were found regarding the setting - day hospital patients were more likely to attend the follow-up interviews than inpatients. Therapy in day hospital requires a higher degree of compliance and personal responsibility which may have conferred to higher commitment to attend follow-up interviews.

Within the given statistical model, only center affiliation and unemployment/receipt of (disability) pension/working in household were predictive factors for not participating in the discharge assessment in the EDEN study. One year after discharge the risk for loss to follow-up was higher for persons treated as inpatients, and for those with a higher level of psychopathological impairment at discharge. Because of these few observed differences between patients re-assessed and not re-assessed, as well as the low rate of explanation of variance within the predictive models for the individual time-points, a meaningful prediction of loss to follow-up was not possible, at least not based on the variables assessed in this study. The possibility that other variables might be significant in predicting the attendance of patients in follow-up interviews should not be excluded, however. For example, the behavior of the interviewer could play a key role - as in a study by BootsMiller *et al.* (1998) who reported that patients participating in a follow-up assessment viewed the relationship with the interviewer as being of greater importance to them than financial rewards.

## CONCLUSION

The inconsistencies within our results as well as the partial inconsistencies between this and previous research may justify the demand for all longitudinal treatment evaluation studies to generally compare the group of patients re-assessed with the group not re-assessed in terms of their most relevant socio-demographic and clinical variables to detect systematic drop-out. This would allow the assessment of the generalizability of results and permit a more comprehensive interpretation of findings (Fischer *et al.*, 2001; Siddiqui *et al.*, 1996). The results of our research strengthen this charge by showing that consistent differences between patients re-assessed and not re-assessed could not be identified, for any of the different follow-up time-points nor for the study centers in different countries. Furthermore, our results do not provide strong predictors of drop-out of certain study participants, thus cannot offer direction for strategies that might minimize loss to follow-up in longitudinal studies. Rather, these findings mainly emphasize the need for application of assiduous follow-up strategies to all study participants.

**Acknowledgements.** The following colleagues contributed to the EDEN-study. Dresden: Thomas Kallert, Tilly Eichler, Matthias Glöckner, Christiane Matthes, Matthias Schützwahl; London: Stefan Priebe, Jane Briscoe, Gemma Jones, Rosemarie McCabe, Paul De Ponte, Alfred Okine, Maria Vidal, Donna Wright; Michalovce: Petr Nawka, Denisa Borosová, Danica Korpová, Helena Reguliová; Prague: Jirí Raboch, Nicole Baková, Andrea Howardová, Jana Peichlová, Miroslav Sekot, Lucie Stárková; Wrocław: Andrzej Kiejna, Tomasz Adamowski, Tomasz Hadrzys, Joanna Jarosz-Nowak, Krzysztof Malyszczak, Joanna Rymaszewska, Krzysztof Szajowski, Elzbieta Trypka.

We gratefully acknowledge the assistance in translation by Charlene Reiss.

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