

Deinstitutionalization revisited: a 5-year follow-up of a randomized clinical trial of hospital-based rehabilitation *versus* specialized assertive intervention (OPUS) *versus* standard treatment for patients with first-episode schizophrenia spectrum disorders

M. Nordentoft^{1*}, J. Øhlenschläger², A. Thorup¹, L. Petersen¹, Pia Jeppesen¹ and M. Bertelsen¹

¹ Copenhagen University, Faculty of Health Sciences, Psychiatric Centre Bispebjerg, Bispebjerg Bakke 23, DK-2400 Copenhagen NV, Denmark

² Psychiatric Centre Sct. Hans, 4000 Roskilde, Denmark

Background. The effects of hospital-based rehabilitation including weekly supportive psychodynamic therapy compared with specialized assertive intervention and standard treatment has not previously been investigated in first-episode psychosis. The aim of the study was to examine long-term effect on use of institutional care of different intensive interventions for patients with first-episode schizophrenia spectrum disorder on use of psychiatric bed days and days in supported housing.

Method. A total of 94 severely ill patients with first-episode schizophrenia spectrum disorders were included in a special part of the Copenhagen OPUS trial and randomized to either the specialized assertive intervention program (OPUS), standard treatment or hospital-based rehabilitation.

Results. It was a stable pattern that patients randomized to hospital-based rehabilitation spent more days in psychiatric wards and in supported housing throughout the 5-year follow-up period compared with the two other groups. Patients in OPUS treatment spent significantly fewer days in psychiatric wards and supported housing in the first 3 years compared with patients in hospital-based rehabilitation. Due to attrition and small sample size, differences in level of psychotic and negative symptoms at 5-year follow-up could not be evaluated.

Conclusions. The study indicates that hospital-based rehabilitation together with weekly supportive psychodynamic therapy was associated with a continued increased use of psychiatric bed days and days in supported housing. The data cannot justify using hospital-based rehabilitation in first-episode psychosis.

Received 12 November 2008; Revised 9 November 2009; Accepted 19 November 2009; First published online 11 January 2010

Key words: Cohort study, first-episode schizophrenia spectrum disorder, intensive intervention, supported housing, use of bed days.

Introduction

Deinstitutionalization has played an important role in the reorganization of psychiatric treatment and it has recently been proposed that deinstitutionalization has gone too far and that the number of beds is reduced below the minimum necessary, which results in revolving-door patients (Lamb & Shaner, 1993).

In the late 1990s, when the present trial was planned, the prevailing attitude, both among politicians and many leaders in psychiatry in Denmark, was that

many patients would benefit from longer admissions and that patients would be better stabilized if it was possible to offer long-term treatment in psychiatric wards. This was the background for the planning and funding of a specialized rehabilitation ward for patients with first-episode psychosis at one of the former state hospitals, Sct. Hans Hospital.

In 1976, the number of psychiatric beds in Denmark was 3.1/1000 inhabitants and, during the years until 2002, the number was reduced to 0.84/1000 (Danish Psychiatric Central Registry and www.statistikbanken.dk). In 1993, the Danish parliament decided that psychiatric beds could not be closed unless they were replaced with places in supported housing facilities.

* Address for correspondence: Dr M. Nordentoft, Copenhagen University, Faculty of Health Sciences, Psychiatric Centre Bispebjerg, Bispebjerg Bakke 23, DK-2400 Copenhagen NV, Denmark.
(Email: mn@dadlnet.dk)

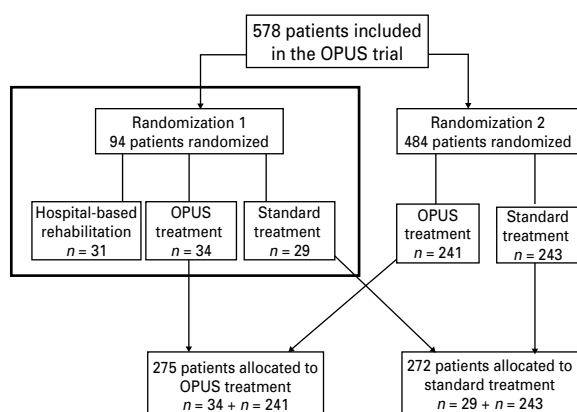


Fig. 1. The randomizations.

However, the possible harmful effects of long periods of institutionalization have also been a concern for decades (Wing & Brown, 1970) and the beneficial effect of long-term hospitalization has yet to be proven. We aimed to investigate the effect of hospital-based rehabilitation on the use of bed days and days in supported housing during and after patients were discharged from the intensive program. The hypothesis was that an early intensive hospital-based rehabilitation program would ensure stabilization and thereby reduce the need for hospitalization after patients were discharged from the program.

Methods

Design

This study examined a subpopulation of patients included in the OPUS trial (Fig. 1) (Petersen *et al.* 2005), for whom long-term admission was assumed to be relevant because of high care needs.

The OPUS trial is a randomized clinical trial concerning treatment of patients with first-episode schizophrenia spectrum disorders in Denmark. The patients were randomly allocated to hospital-based rehabilitation during an in-patient stay, offered for at least 3 months, specialized assertive intervention (OPUS) or standard treatment, as the object of the study was to compare the effect of different degrees of intensity of intervention in hospital-based rehabilitation (OPUS) and standard treatment. The patients were included consecutively from 1 March 1998 to 31 December 2000, during which period the number of hospital beds did not change.

The researchers conducting the 5-year follow-up interviews were blinded to treatment allocation. The trial was approved by the local ethical committee (KF 01–387–97).

Sample

The inclusion criteria in the OPUS trial were: (1) age 18–35 years; (2) permanent residence in the catchment area; (3) schizophrenia, schizotypal disorder, delusional disorder, acute or transient psychosis, schizo-affective psychosis, induced psychosis or unspecified non-organic psychosis, according to ICD-10 research criteria (WHO, 1993) based on Schedules for Clinical Assessment of Neuro-psychiatry; (4) fewer than 12 weeks of treatment with antipsychotic medication; (5) ability to communicate in Danish without an interpreter; (6) accepted to participate in the trial; (7) signed informed consent. As can be seen in Fig. 1, a total of 578 patients were included in the trial. In total, 484 participated in a two-armed randomization and a group of 94 patients from Copenhagen were invited to participate in a three-armed randomization, where patients were allocated either to OPUS treatment, standard treatment or hospital-based rehabilitation. Only in-patients were offered participation in the three-armed randomization and only if their first treatment plan in the hospital did not include plans for rapid discharge.

Independent research assistants, who were psychologists and psychiatrists under training, did the evaluation.

When patients were referred, the baseline interviews were performed within 7 days and the randomization was done immediately thereafter. The randomization was carried out by using centralized telephone allocation via The Copenhagen Trial Unit, with computer-generated random lists of numbers to allocate patients. Generation of allocation sequence was performed in blocks of nine (1:1:1) for each of six hospitals (Rigshospitalet, Bispebjerg Hospital, Kommunehospitalet, Hvidovre Hospital, Sct. Hans Psychiatric Hospital, Frederiksberg Hospital). The random allocation sequence was concealed from assessors.

Outcome measures

The primary outcome measure was use of bed days at psychiatric wards and use of days in supported housing facilities.

Using the unique Danish registers described below, it is possible to carry out a complete follow-up of all patients with regard to a range of relevant processes and outcome measures. Information about use of bed days and housing situation was collected for all patients included in the trial (100% follow-up rate), except those who had died, disappeared or emigrated:

- The Danish Civil Registration System (Pedersen *et al.* 2006). All living persons residing in Denmark

are registered and assigned a 10-digit personal identification number (CPR-number). The register contains continuously updated information (dead, emigrated, disappeared or alive).

- Information about use of bed days was extracted from the Danish Psychiatric Central Register (Munk-Jorgensen & Mortensen, 1997).
- A database with addresses of all supported housing facilities in all counties and municipalities was combined with the information about addresses in the Civil Registration System, thus extracting information about independent living and supported housing.

We analysed days in supported housing and use of bed days as two independent results, even though in some cases it will imply that the total number of days in institutions (supported housing and psychiatric wards) over the period of 1 year exceeds 365 days. This way of analysing data was partly chosen for practical reasons and partly to reflect the costs of treatment.

The secondary outcome measure was the effect on severity of psychotic and negative symptoms, evaluated with Scale for Assessment of Positive Symptoms and Scale for Assessment of Negative Symptoms. The psychotic dimension was defined as hallucinations and delusions, the negative dimension was defined as affective flattening, avolition and anhedonia and the disorganized dimension was defined as bizarre behaviour, formal thought disorder and inappropriate affect (Andreasen *et al.* 1995; Arndt *et al.* 1995).

Interventions

The treatment elements in the intervention groups were offered for a period of 2 years.

Hospital-based rehabilitation was offered in the psychiatric unit 'U7', a specialized psychiatric unit at Sct. Hans Hospital. Treatment consisted of the following:

- (1) Admission was offered for a minimum period of 3 months. The unit was a combined secluded/non-secluded facility, ensuring that patients requiring seclusion could remain in the same unit. During admission, three teams – each consisting of one senior psychiatrist, one psychologist, one social worker and six nurses – had responsibility for treatment of the patients. Continuity in care was secured by assigning each patient to one primary staff member with a caseload of not more than seven patients and to one psychiatrist with a caseload of not more than 20 patients. The team was responsible for maintaining contact and

treatment adherence and for coordinating treatment. The teams had strategy meetings twice per month. Out-patients had the opportunity of maintaining contact with the psychiatrist, the psychologist, the team and the primary staff member during the treatment period. This contact could be in the form of telephone contact or staff members visiting the patient at home.

- (2) Medication. The guidelines of The Danish Psychiatric Association (1998) were followed, primarily using the newer antipsychotic medication in a low dosage.
- (3) Psycho-educational family treatment. Family treatment was offered to patients and their families if the patient had significant others (parents, relatives or friends). The treatment consisted of three elements modelled on psycho-educational multiple family group treatment (McFarlane, 1995): (a) one or two meetings without the patient, to ensure an alliance and a review of the crisis; (b) survival skills workshop (Anderson *et al.* 1986); (c) multiple family group sessions, which included the patient, conducted by two therapists with focus on problem solving and coping. The meetings were supervised and took place twice monthly. Each session lasted 1.5 h. The maximum number of sessions was 15. The patients were encouraged to attend ten 1-h psycho-educational group sessions. (McFarlane, 1995, 2002). Patients and families were encouraged to continue in multiple family group treatment if they were discharged from hospital before the group program ended.
- (4) Social rehabilitation. The following were evaluated: assessment of daily function; training in activity of daily living; assessment of the possibility of vocational rehabilitation; assessment of special accommodation needs. Based on the assessments, a plan for discharge was made, which included accommodation, employment, education and economy. The patients received psycho-education by the teams (ten 1-h sessions).
- (5) Individual psychotherapy. All patients were offered supportive psychodynamic therapy conducted by a senior psychiatrist or psychologist. Each session lasted 45 min and took place once per week for a maximum period of 2 years. Within that time-frame, patients could continue the weekly psychotherapeutic sessions after discharge. The therapist participated in externally led group supervision.
- (6) Milieu therapy. This consisted of planning and training daily activities, information meetings, education, gymnastics and coping strategies and was externally supervised.

It was possible for patients to take part in milieu therapy after discharge. To our knowledge, no instrument has been developed to measure fidelity of in-hospital treatment.

Specialized assertive intervention (OPUS) was modelled on elements described by Stein & Test (1980) and consisted of:

- (1) Assertive community treatment. Two teams were established in Copenhagen, each with one senior psychiatrist, one psychologist, one or two nurses, one occupational therapist, one social worker and a vocational/educational guide (who served in both teams). The caseload did not exceed 10 patients per case manager. One primary person was responsible for maintaining contact, coordinating treatment and treatment adherence. The patients were also visited weekly when hospitalized. During admission, however, treatment responsibility was transferred to the hospital. These teams treated patients allocated to OPUS in the two-armed and three-armed randomization. The average number of patients in the teams was 60.
- (2) Medication. As in hospital-based rehabilitation.
- (3) Psycho-educational family treatment. As in hospital-based rehabilitation, but the multifamily groups continued for 1.5 years with approximately 40 sessions. The therapists were externally supervised.
- (4) Social skills training was inspired by the model described by Liberman *et al.* (1986). Patients with impaired skills were offered training in groups with a maximum of six participants. There were two therapists, one of whom was a psychologist. The training consisted of modules: medication self-management; coping with symptoms; conversational skills; problem solving; conflict management. Patients who did not need training received individual psycho-education from the primary staff member.
- (5) Psychological treatment. If needed, the patients were offered supportive or cognitive therapy. The reliability of the program has been described elsewhere and was measured with the Index of Fidelity of Assertive Community Treatment (McGrew *et al.* 1994), which was 70%. The reduced fidelity was due to the lack of 24-h coverage and approximately, weekly face-to-face meetings between staff member and patient.

All elements of the treatment were taught and supervised by external experts, both before the treatment started and during the intervention period.

Standard treatment

Most patients were offered treatment at a community mental health centre after discharge. They were usually seen in the office, each patient being in contact with a physician, a community mental health nurse and a social worker. The caseload of the staff in the community mental health centres varied between 1:20 and 1:30. Standard treatment consisted of the following elements:

- (1) Admission. Decisions on the need for hospitalization or out-patient treatment were made as usual. Patients in standard treatment and OPUS patients were admitted to the same psychiatric departments as patients not included in the trial. The patients in standard treatment did not receive the experimental interventions. Patients in standard treatment seldom met the therapists from the local community mental health centre before they were discharged to follow-up treatment at the centre.
- (2) Medication. As in hospital-based rehabilitation.
- (3) Psycho-educational family treatment. A minor proportion of the patients were offered supportive contacts with members of their families or educational groups for relatives.
- (4) Social rehabilitation. Supportive counselling, psycho-education, vocational guidance and training in daily living activities were offered sporadically.
- (5) Psychological treatment. This was not offered systematically.

Limitations of the study

Five people died and one person had emigrated before the 5-year follow-up. Data on use of bed days and use in supported housing facility were available for all patients except those who had died or emigrated. Only 57% of those alive and living in Denmark participated in the 5-year follow-up interview and significantly fewer in hospital-based rehabilitation than in OPUS and standard treatment. A total of 59% from OPUS participated, 73% in standard treatment and 40% in hospital-based rehabilitation (Pearson $\chi^2 = 6.35$, $df = 2$, $p < 0.05$).

There were no significant differences in baseline measures regarding educational level and in psychotic and negative symptoms between those patients who attended the 5-year follow-up and those who did not, but men were significantly more likely to participate in the interview than women (66.1% of the men *v.* 40.6% of the women; Pearson $\chi^2 = 5.37$, $p < 0.05$).

Table 1. Sex, age, clinical characteristics, accommodation and employment status among 94 first-episode psychotic patients

Characteristics at baseline	Hospital-based rehabilitation (<i>n</i> = 31)	OPUS treatment (<i>n</i> = 34)	Standard treatment (<i>n</i> = 29)	Significance
Males, <i>n</i>	20 (64.5%)	22 (64.7%)	20 (69.0%)	<i>p</i> = 0.92
Age (years) mean (s.d.)	24.97 (5.06)	23.83 (4.01)	23.24 (4.21)	<i>p</i> = 0.31
Accommodation				
Living independently, not with parent(s), <i>n</i>	23 (74.2%)	29 (85.3%)	22 (75.9%)	<i>p</i> = 0.50
Employment status ^a (<i>n</i> = 84)				
Employed, <i>n</i>	3/27 (11.1%)	11/32 (34.4%)	7/25 (28.0%)	<i>p</i> = 0.11
Diagnosis (F20–29)				<i>p</i> = 0.78
Schizophrenia, <i>n</i>	26 (83.9%)	23 (67.6%)	18 (62.1%)	
Schizotypal disorder, <i>n</i>	3 (9.7%)	6 (17.7%)	6 (20.7%)	
Delusional disorder, <i>n</i>	1 (3.2%)	2 (5.9%)	1 (3.5%)	
Brief psychosis, <i>n</i>	1 (3.2%)	2 (5.9%)	2 (6.9%)	
Schizoaffective disorder, <i>n</i>	0	1 (2.9%)	2 (6.9%)	
Psychopathology, mean (s.d.)				
Psychotic dimension	3.58 (1.43)	3.40 (1.53)	2.35 (1.48)	<i>p</i> = 0.03
Negative dimension	2.73 (1.19)	2.74 (0.98)	2.67 (1.06)	<i>p</i> = 0.97
Disorganized dimension	1.12 (0.85)	1.40 (1.10)	1.26 (1.27)	<i>p</i> = 0.59
Co-morbidity				
Harm or dependence syndrome <i>n</i>	17 (54.8%)	20 (58.8%)	16 (55.2%)	<i>p</i> = 0.37
Social function, mean, (s.d.)				
GAF, symptoms	29.42 (8.23)	32.32 (11.71)	32.10 (12.47)	<i>p</i> = 0.51
GAF, disability	34.29 (8.83)	39.38 (9.38)	35.62 (14.01)	<i>p</i> = 0.15

GAF, Global assessment of function.

χ^2 test was used for categorical data.

Analysis of variance was used for continuous data.

^a Paid employment = 'yes'; all other answers = 'no'.

Data analysis

Statistics

The Statistical Package for the Social Sciences for Windows, version 13.0 (SPSS Inc., USA) was used. Analyses of variance were used to test differences in use of bed days and use of supported housing. Analyses were conducted for each of the 5 years of follow-up and only patients who were alive and living in Denmark during the entire year were included in the analyses of service use for that year. Psychotic and negative symptom dimensions were analyzed as continuous outcome measures using analyses of covariance, with the baseline value of the scale included as a covariate. Gender was also included as a covariate, because analyses of attrition showed gender differences in participation in the follow-up interview. Because of the large and skewed attrition from the study, sensitivity analyses were also carried out. The level of significance chosen was 0.05 (two-tailed).

Power calculation

The primary outcome measure was use of bed days in a psychiatric ward and days in supported housing, combined as a common measure of use of days in institution. With a level of significance of 0.05 and 80% power, 28 patients were needed in each group to be able to detect a difference between a mean of 75 days and 150 days (s.d. = 100). Thus, the study only has sufficient power to detect rather large differences in use of days in an institution.

Results

Baseline

As shown in Table 1, 94 patients were included (hospital-based rehabilitation *n* = 31, OPUS *n* = 34 and standard treatment *n* = 29). Baseline data can be summarized as follows: the mean age in years in the study population was 24.03 (s.d. = 4.45); 62 were male (66%); 74 lived unsupervised (79%); 53 had

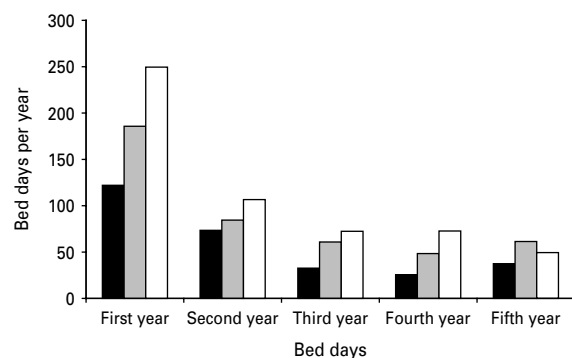


Fig. 2. Number of bed days in psychiatric department during 5-year follow-up of first-episode psychotic patients randomized to OPUS treatment (■), standard treatment (▒) or hospital-based rehabilitation (□).

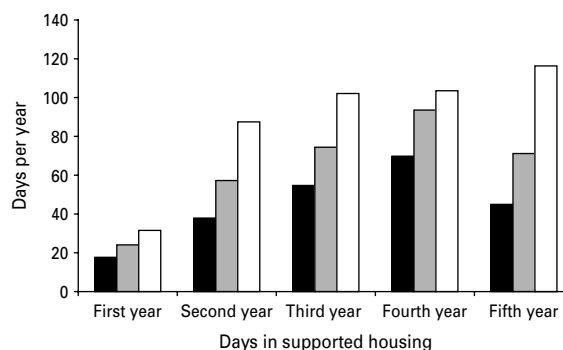


Fig. 3. Number of days in supported housing during 5-year follow-up of first-episode psychotic patients randomized to OPUS treatment (■), standard treatment (▒) or hospital-based rehabilitation (□).

secondary substance abuse (diagnosed with harm or dependency syndrome in ICD 10) (56%); 67 were diagnosed with schizophrenia (71%); 15 with schizotypal disorder (16%); four with delusional disorder (4%); five with brief psychosis (5%); three with schizoaffective disorder (3%). The mean scores (s.d.) on global assessment of function were for symptoms and function 31.3 (10.9) and 35.5 (10.0), respectively. There were no significant differences in baseline characteristics between treatment groups. Unexpectedly, a statistically significant difference in the psychotic dimension was found at baseline, with hospital-based rehabilitation having a mean score of 3.58, (s.d. = 1.43), OPUS treatment mean = 3.40, (s.d. = 1.53) and standard treatment mean = 2.35 (s.d. = 1.48) ($p = 0.03$).

5-Year follow-up

The use of bed days and days in supported housing facility are shown in Figs. 2 and 3 and a combined measure of total days in institution is shown in Fig. 4. For some patients, more than 365 days were used in supported housing facilities and psychiatric ward in 1 year, because it was possible to use service facilities in both places at the same time. Even if differences did not reach a level of statistical significance every year, use of bed days in psychiatric wards and use of supported housing followed the same pattern throughout the 5-year period, with the highest use of both kinds of services in the hospital-based rehabilitation group and lowest use in the OPUS group. The only exception is that in year 5 the hospital-based rehabilitation group had a lower use of bed days than the standard treatment group. In the combined measure, there is a significant difference between OPUS and hospital-based rehabilitation in the first 3 years, but in years 4 and 5 the differences became

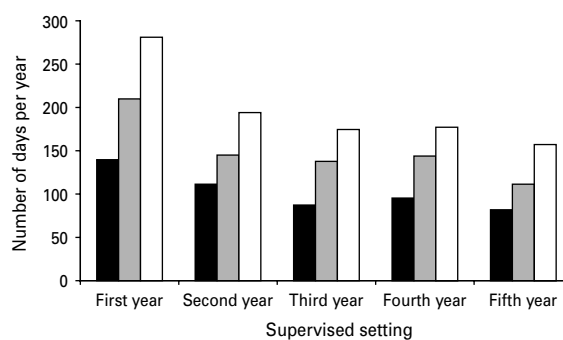


Fig. 4. Number of days in psychiatric department or supported housing during 5-year follow-up of first-episode psychotic patients randomized to OPUS treatment (■), standard treatment (▒) or hospital-based rehabilitation (□).

insignificant ($p = 0.07$ and 0.1 , respectively). The proportion of patients who were admitted some time during a year was high in all three groups, ranging from 95% during the first year to 55% during the second year and 35% in the fifth year. There were no significant differences in the proportion admitted between the three treatment groups.

There were no significant differences between the three groups in psychotic or negative dimension at 5-year follow-up. The differences in the psychotic and negative dimension between patients treated in OPUS and in hospital-based rehabilitation were in favor of OPUS, but the difference did not reach statistical significance (parameter estimate: psychotic dimension -0.34 [95% confidence interval (CI) -1.2 to 0.5]; negative dimension -0.45 (95% CI -1.4 to 0.5)). In sensitivity analyses, two different assumptions were tested about the patients who did not participate in the 5-year follow-up interview. The less favorable prognostic factors among non-participants compared with participants suggest that non-participants as a

group fared worse. Thus, if available, the 2-year values of the psychotic and negative dimensions were carried forward to 5-year follow-up for patients dropping out. If these were not available, the 1-year values or, alternatively, the baseline values were carried forward. The other assumption was that patients who did not participate in the follow-up interview had experienced a total remission of psychotic and negative symptoms. On the basis of this assumption, the psychotic and negative dimensions at 5-year follow-up were set to zero. None of these analyses revealed significant differences.

Women had fewer psychotic and negative symptoms than men [parameter estimate: psychotic dimension -0.86 (95% CI -1.7 to 0.0); negative dimension -0.73 (95% CI -1.6 to 0.1)].

Discussion

This is the first randomized clinical trial to compare hospital-based rehabilitation with specialized assertive intervention (OPUS) and standard treatment for patients with first-episode schizophrenia-spectrum disorders. The 1-year follow-up data from this study were previously published (Ohlenschlaeger *et al.* 2007), but this is the first report on 5-year follow-up data.

It was expected that patients in hospital-based rehabilitation would have a higher use of psychiatric bed days in the first year, since patients were randomized to rehabilitation offered for at least 3 months of hospitalization. However, contrary to our expectations, we found that the patients in hospital-based rehabilitation had a higher use of psychiatric bed days, as well as in the years following the experimental intervention. Rather than stabilizing the condition, it seems that rehabilitation during hospitalization makes it more likely that, in the future, the patient will be in need of further institutional care. It can be hypothesized that patients who spend long periods of time in hospital lose some of their ability to live independently. The same pattern was found for use of supported housing; thus, hospital-based rehabilitation seems to make patients more dependent on institutional care. During the fifth year of the follow-up period, the mean use of institutional days (supported housing and bed days in psychiatric department combined) was 157 days for the patients randomized to hospital-based rehabilitation, which indicates a very high use of institutional care. Due to the small sample size, the group differences did not reach statistical significance every year. However, it was a stable pattern that hospital-based rehabilitation patients had a higher level of institutional care than OPUS patients. As hospital-based rehabilitation is very costly and

of long duration, it is difficult to establish sufficiently powered trials. To our knowledge, this trial is the only one for first-episode psychosis; very few small trials have been made with chronic patients (Marshall & Lockwood, 2003).

It can be argued that both standard treatment and OPUS overlook the needs of the severely ill patients and that some of these patients would have been better treated with an in-patient stay. However, even though the sample is too small for conclusive evaluation of clinical outcome, the data do not indicate any worse outcome for OPUS or standard treatment with regard to symptom level; rather on the contrary, even though clinical results were not statistically significant. Also, the larger attrition from the study in the patient group treated with hospital-based rehabilitation indicates that hospital-based rehabilitation patients were the most reluctant to attend follow-up interviews.

All the three groups in the study had long-term admissions and both experimental groups had a mean duration of admission of more than 100 days during the first year and more than half of the patients had co-morbid substance abuse. This indicates that the study population is a selected group of patients with the most severe type of mental illness. Even for this selected, severely ill group of patients, data indicate that assertive out-patient treatment is more beneficial for the long-term outcome than hospital-based rehabilitation. The hypothesis that long-term hospital-based rehabilitation was associated with reduced use of bed days after first admission was rejected.

In this study we compared different organizational models of treatment of severe cases of first episode, but also the theoretical framework for the psychosocial interventions was different in two of the treatment groups. In hospital-based rehabilitation the patients were offered supportive psychodynamic therapy weekly and in specialized assertive treatment (OPUS) several elements in the treatment were based on cognitive behavioural therapy. At the time of planning the trial there was no evidence for the use of psychodynamic therapy and the reason for choosing this approach was mainly based on traditions in Sct Hans Hospital. Although some studies have shown positive results (e.g. Hauff *et al.* 2002), there is no evidence for psychodynamic therapy in hospitalized patients with schizophrenia being associated with improved ability to independent living (Malmberg & Fenton, 2001). Although not designed to specifically evaluate the effect of supportive psychodynamic therapy, our study does add to the evidence for using this kind of therapy in hospitalized patients with first-episode psychotic illness.

Conclusions

We found that the results in this study are in concert with other randomized (Marshall & Lockwood, 2003) and non-randomized (McGorry et al. 1996; Cullberg et al. 2002) studies of assertive community treatment.

We found that in a group of the most severely ill among first-episode psychotic patients, OPUS-treated patients had fewer bed days and days in supported housing than patients treated in hospital-based rehabilitation, as well as in the years after the experimental intervention had ended. This indicates a long-term effect of the experimental treatment.

The findings should, however, be interpreted with caution because of the size of the study.

Acknowledgements

This study was supported by grants from The Copenhagen Hospital Corporation (H:S) (se. no. 46/03s & 142/01), The Medical Research Fund for Copenhagen, Faroe Islands & Greenland, The Psychiatric Research Fund of 1969 and The Danish Psychiatric Association. The project has received grants from The Danish Ministry of Health (jr.nr. 96-0770-71), The Danish Ministry of Social Affairs, The University of Copenhagen, The Copenhagen Hospital Corporation, The Danish Medical Research Council (jr.nr. 9601612 and 9900734) and Slagtermester Wørzners Foundation. The Staff at Copenhagen Trial Unit planned and conducted the randomization procedure for the Copenhagen patients. Professor Philip Hougaard supervised the statistical analyses.

Declaration of Interest

None.

References

- Anderson CM, Reiss DJ, Hogarty GE (1986). *Schizophrenia in the Family. A Practitioner's Guide to Psychoeducation and Management*. Guilford Press: New York.
- Andreasen NC, Arndt S, Alliger R, Miller D, Flaum M (1995). Symptoms of schizophrenia. Methods, meanings, and mechanisms. *Archives of General Psychiatry* **52**, 341-351.
- Arndt S, Andreasen NC, Flaum M, Miller D, Nopoulos P (1995). A longitudinal study of symptom dimensions in schizophrenia. Prediction and patterns of change. *Archives of General Psychiatry* **52**, 352-360.
- Cullberg J, Levander S, Holmqvist R, Mattsson M, Wieselgren IM (2002). One-year outcome in first episode psychosis patients in the Swedish Parachute project. *Acta Psychiatrica Scandinavica* **106**, 276-285.

- Danish Psychiatric Association (1998). www.dpsnet.dk/fileadmin/web-filer/PDF/Rapporter/039_klaringsrapport_antipsykotika.pdf.
- Hauff E, Varvin S, Laake P, Melle I, Vaglum P, Friis S (2002). Inpatient psychotherapy compared with usual care for patients who have schizophrenic psychoses. *Psychiatric Services* **53**, 471-473.
- Lamb HR, Shaner R (1993). When there are almost no state hospital beds left. [Review]. *Hospital and Community Psychiatry* **44**, 973-976.
- Liberman RP, Mueser KT, Wallace CJ, Jacobs HE, Eckman T, Massel HK (1986). Training skills in the psychiatrically disabled: learning coping and competence. *Schizophrenia Bulletin* **12**, 631-647.
- Malmberg L, Fenton M (2001). Individual psychodynamic psychotherapy and psychoanalysis for schizophrenia and severe mental illness. *Cochrane Database of Systematic Reviews*. Art No. CD001360. Issue 3. doi: 10.1002/14651858.
- Marshall M, Lockwood A (2003). Assertive Community Treatment for people with severe mental disorders. *Cochrane Library* **5**.
- McFarlane WR (1995). Multiple-family groups and psychoeducation in the treatment of schizophrenia. *Archives of General Psychiatry* **52**, 679-687.
- McFarlane WR (2002). *Multifamily Groups in the Treatment of Severe Psychiatric Disorders*. Guilford Press: New York/London.
- McGorry PD, Edwards J, Mihalopoulos C, Harrigan SM, Jackson HJ (1996). EPPIC: an evolving system of early detection and optimal management. *Schizophrenia Bulletin* **22**, 305-326.
- McGrew JH, Bond GR, Dietzen L, Salyers M (1994). Measuring the fidelity of implementation of a mental health program model. *Journal of Consulting and Clinical Psychology* **62**, 670-678.
- Munk-Jorgensen P, Mortensen PB (1997). The Danish Psychiatric Central Register. *Danish Medical Bulletin* **44**, 82-84.
- Ohlenschlaeger J, Thorup A, Petersen L, Jeppesen P, Koster A, Munkner R, Nordentoft M (2007). Intensive treatment models and coercion. *Nordic Journal of Psychiatry* **61**, 369-378.
- Pedersen CB, Gotzsche H, Moller JO, Mortensen PB (2006). The Danish Civil Registration System. A cohort of eight million persons. *Danish Medical Bulletin* **53**, 441-449.
- Petersen L, Jeppesen P, Thorup A, Abel MB, Ohlenschlaeger J, Christensen TO, Krarup G, Jorgensen P, Nordentoft M (2005). A randomised multicentre trial of integrated versus standard treatment for patients with a first episode of psychotic illness. *British Medical Journal* **331**, 602.
- Stein LI, Test MA (1980). Alternative to mental hospital treatment. I. Conceptual model, treatment program, and clinical evaluation. *Archives of General Psychiatry* **37**, 392-397.
- WHO (1993). *ICD-10 Classification of Mental Health and Behavioral Disorders. Diagnostic Criteria for Research*, 1st edn. WHO: Geneva.
- Wing JK, Brown GW (1970). *Institutionalism and Schizophrenia*. Cambridge University Press: Cambridge.