Reductions in Postdischarge Suicide After Deinstitutionalization and Decentralization: A Nationwide Register Study in Finland

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Objective: This study analyzed trends in suicides occurring after a psychiatric hospitalization during more than a decade of significant structural changes in mental health services in Finland—that is, deinstitutionalization, downsizing of inpatient care, and decentralization. *Methods:* Retrospective register data on completed suicides and psychiatric inpatient treatments were collected for the periods 1985–1991 and 1995–2001, representing service provision before and after significant structural changes. The data were used to produce an estimate for a change in postdischarge suicide risk. *Results:* In both periods, a fifth of suicide victims had been psychiatrically hospitalized within the preceding year. Among persons hospitalized, the risk of suicide was greater in 1985–1991 than in 1995–2001 for both one week after discharge (risk ratio [RR]=1.50, 95% confidence interval [CI]=1.38–1.62) and one year after discharge (RR=1.25, CI=1.19–1.30). When types of disorders were analyzed separately, the relative risk of suicide one year postdischarge for those hospitalized in the earlier period was greater for patients with schizophrenia (RR=1.26, CI=1.17–1.36) and patients with affective disorders (RR=1.60, CI=1.48–1.73). In parallel with general development of inpatient psychiatric services, in 1995–2001 the inpatient treatment periods preceding suicides were significantly shorter (a mean±SD of 45±340 days in 1995–2001, compared with a mean of 98±558 days in 1985–1991), the number of individual patients treated in the hospital for schizophrenia spectrum disorders was lower (26% compared with 36%), and the number treated for affective disorders was higher (45% compared with 35%). *Conclusions:* The restructuring and downsizing of mental health services was not associated with any increase in suicides immediately (one week) or one year postdischarge. Instead, the risk of these suicides decreased significantly between the two time periods among several diagnostic categories. Although the role of psychiatric hospitalization in general may have changed over time, patients who are hospitalized now may be less suicidal after discharge. Our results indicate, in terms of postdischarge suicides, that the downsizing of psychiatric hospitals has been a success. However, there is still a substantial need for better recognition of suicidal risk among psychiatric patients. (*Psychiatric Services* 58:221–226, 2007)

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A psychiatric disorder that necessitates hospital treatment is known to be one of the strongest risk factors for completed suicide (1). Furthermore, the time after psychiatric hospitalization is known to be a high-risk period for suicide, particularly in the first four weeks, and the risk remains elevated for up to one year (2,3–5).

The general suicide trend among persons with mental illness has been decreasing according to some reports (4,6). In contrast, a recent report from Sweden suggests an increased mortality among patients with schizophrenia during an era of reduced psychiatric hospital care (7). A Finnish study reported a similar trend only for those with a duration of illness lasting less than five years (8). Suicide has been proposed as a major factor explaining the increased mortality among patients with schizophrenia in relation to deinstitutionalization (7, 9). Altogether, the impact of changes in psychiatric inpatient treatment practices on suicide rates is as yet unknown, but concerns about possible negative trends and the consequences of uncontrolled transitions have emerged.

A major policy shift from hospital-based treatment to community care has been implemented all over the Western world (10). In Finland, over a 20-year period, three-quarters of the mental hospital beds have been taken out of commission, and patients are expected to use outpatient services, including housing services, that are mostly provided by private com-

panies or nongovernmental organizations (11). In the beginning of the 1990s the responsibility for organizing health care was transferred from the state to more than 400 local authority municipalities as part of a decentralizing process. At the same time, a major national economic recession contributed to the large-scale deinstitutionalization process now being evaluated.

The total number of annual psychiatric inpatient days in Finland declined from 5.1 million in 1985 to 1.9 million in 2001 (11). The decline has been shown to be mostly due to the shortening of treatment periods, although it is also partly due to transferring geriatric patients with mainly dementia and patients with mental handicaps to nonpsychiatric institutions (11). The suicide rate in Finland had been increasing until 1990, after which the trend decreased. Between 1990 and 2001, suicide mortality in Finland declined 24% to 36.8 per 100,000 among males and 10.2 per 100,000 among females in 2001 (12).

We set out to investigate the nationwide pattern of postdischarge suicides and factors associated with suicides within one week and within one year after discharge. We previously reported that suicides within a week of discharge shared certain distinguishable characteristics (13). In the study reported here we compared the risk of postdischarge suicides between 1985–1991 and 1995–2001, with the purpose of exploring its association with a significant period of deinstitutionalization, downsizing of psychiatric inpatient care, and restructuring of mental health services. We expected to see a relative increase in postdischarge suicides up to one year, because of the reduced length of hospital stays and possibly concomitant premature discharges. To control for the effect of shorter hospital stays, we also analyzed the immediate postdischarge suicides from 1985 to 2001 for treatments that lasted less than a week.

Methods
Registers
We retrieved data on all suicides (N=22,717) from the National Register for Causes of Death from 1985 to 2001 in Finland. The personal identification codes of these cases were linked to the Finnish Hospital Discharge Register, which includes data on all inpatient treatments in Finland from 1969. Postdischarge suicide was defined as any suicide, according to the *ICD*-classification, occurring within a year of discharge from a psychiatric ward, and immediate postdischarge suicide was defined as any suicide occurring within a week. Psychiatric hospitalizations were defined as any inpatient treatment periods in a psychiatric facility with a discharge diagnosis convertible to the *ICD-10* class of mental and behavioral disorders (Chapter V). The day of discharge in the year before suicide was the starting point in estimating the annual suicide risk of discharged psychiatric patients. Sociodemographic variables (age and sex) were recorded from registers of Statistics Finland.

Suicide data and the samples
We chose two periods to study so as to represent changes in the structure of mental health services in Finland. The first sample of suicides was from 1985 to 1991 (N=9,719), the period before legislation was changed in 1991. After 1991 the responsibility for arranging all health services was transferred to local municipalities. Following the legislative change, a significant economic recession occurred from 1992 to 1994, during which time the downsizing of inpatient psychiatric treatment continued and funds for adequate compensatory outpatient resources were scarce. The second study sample was from 1995 to 2001 (N=8,761), in which time the structural and administrative changes were thought to have stabilized. To control for variation in treatment duration, we performed a time series analysis on the annual rates of suicides (proportion of suicides compared with proportion of nonsuicides) within a week of discharge for treatment periods shorter than a week between 1985 and 2001.

Discharge diagnoses
In Finland, the eighth version of the World Health Organization's *International Classification of Diseases (ICD-8)* was used until 1987. After that, the revised third edition of the *Diagnostic and Statistical Manual of Mental Disorders (DSM-III-R)* (14), developed by the American Psychiatric Association, was adopted. The tenth version of the *ICD* was introduced in 1996 (15). The discharge diagnoses from psychiatric treatment periods were converted to current *ICD-10* codes for metacategories of substance use disorders (F10–F19), schizophrenia spectrum disorders (F20–F29), affective disorders (F30–F39), stress- and anxiety-related and somatoform disorders (F40–F49), disorders related to physiology and bodily functions (F50–F59), personality disorders (F60–F69), and other disorders (F0–F09 and F70–F99). The discharge diagnoses by different diagnostic systems were relatively easily harmonizable within this broader classification.

The reference data
In order to control for general changes in psychiatric hospital practices in Finland during the study period, we examined the Finnish Hospital Discharge Register for trends in psychiatric inpatient treatment. Time trends in the number of hospitalizations for the different diagnostic categories for mental disorders were evaluated. For patient calculations, within one year an individual was counted only once as an inpatient, even in cases in which there were several treatment periods. Individuals with principal diagnoses in more than one metacategory during a year were allocated to a mixed category. When we evaluated the suicide risk for different diagnostic metacategories, an annual count was chosen and the last discharge diagnosis was taken to represent the primary diagnosis for each year. It was accepted that suicides in 1985 or 1995 were possibly preceded by treatment periods already in 1984 or 1994, as well as the fact that treatment periods in 1991 or 2001 could be associated with suicides after the data collection period. A possible bias resulting from this shift in time frame was considered minimal and was not expected to be different between the samples.

Statistical methods
Basic statistical tests were used for bivariate analyses of the data: a chi square test and a two-tailed t test.

Table 1

Characteristics of persons in Finland who committed suicide, by year and by whether they were hospitalized recently

| | Suicides 1985–1991 (N=9,719) | | | | | | Suicides 1995–2001 (N=8,761) | | | | | |
| | Not hospitalized within the past year (N=7,738) | | Hospitalized within the past year (N=1,981) | | Adjusted OR | 95% CI | Not hospitalized within the past year (N=6,896) | | Hospitalized within the past year (N=1,865) | | Adjusted OR | 95% CI |
Characteristic	N	%	N	%			N	%	N	%		
Age (M±SD)	44.8 ±17.5		42.7 ±14.3				45.8 ±16.9		43.8 ±14.0			
Male	6,373	82.4	1,293	65.3	1.00		5,558	80.6	1,246	66.8	1.00	
Female	1,365	17.6	688	34.7	1.78	1.59–2.00	1,338	19.4	619	33.2	1.48	1.32–1.67
Socioeconomic status												
Upper-level employee	364	4.7	98	4.9	.59	.45–.77	264	3.8	118	6.3	1.12	.87–1.44
Lower-level employee	705	9.1	226	11.4	.76	.63–.92	613	8.9	171	9.2	.79	.66–.96
Entrepreneur	602	7.8	102	5.1	.55	.47–.64	459	6.7	84	4.5	.71	.61–.82
Worker	2,413	31.2	418	21.1	.92	.74–1.14	1,231	17.9	244	13.1	.85	.68–1.06
Student	368	4.8	95	4.8	.41	.32–.53	493	7.1	178	9.5	.79	.65–.96
Retired	2,116	27.3	734	37.1	2.04	1.72–2.41	1,888	27.4	600	32.2	2.45	2.11–2.85
Other or undetermined	1,100	14.2	289	14.6	1.00		1,913	27.7	461	24.7	1.00	
Education												
High school or higher	698	9.0	258	13.0	1.7	1.43–2.03	823	11.9	328	17.6	1.49	1.27–1.75
Middle school	2,416	31.2	667	33.7	1.29	1.16–1.44	2,583	37.5	731	39.2	1.27	1.14–1.41
Elementary school	4,624	59.8	1,056	53.3	1.00		3,490	50.6	806	43.2	1.00	
Marital status												
Unmarried	3,115	40.3	922	46.5	1.36	1.2–1.54	2,958	42.9	799	42.8	1.14	1.00–1.30
Widow	536	6.9	123	6.2	.83	.67–1.02	401	5.8	86	4.6	.93	.75–1.17
Separated	116	1.5	39	2.0	2.41	1.7–3.42	8	.1	1	.1	.67	.13–3.53
Divorced	1,038	13.4	312	15.7	1.72	1.49–1.98	1,350	19.6	447	24.0	1.96	1.72–2.24
Married	2,933	37.9	585	29.5	1.00		2,178	31.6	532	28.5	1.00	

The risk ratio between the two samples was calculated for suicide risk within a year from discharge. Time trends were analyzed by using linear regression. Age- and sex-adjusted logistic regression models were used to estimate the significance of individual factors in characterizing suicide victims who had been hospitalized within a year before the suicide. SPSS version 12.0 was used for analyses.

Results

More than a third of the suicide victims in this study (8,096 of 22,171 persons, or 35.6%) had been hospitalized at some point after 1969. In both time periods, persons who committed suicide who had a preceding hospitalization were more likely to be female, to be retired, to have a higher level of education, and to be unmarried or divorced (Table 1). During the period from 1990 to 2001, suicide rates in Finland diminished by about a quarter, and the decrease has continued ever since (11). According to our data, from the year 1990 onward, the most marked reduction does not involve persons who had been recently psychiatrically hospitalized; instead it involves those without hospitalizations during the previous year ($\beta=-4.61$, p<.005 compared with $\beta=-28.02$, p<.001; F=62.27, df=1 and 20, p<.001).

An increase was observed from 1985 to 2001 in the annual number of people hospitalized at least once with a principal diagnosis of affective disorder (4,062 to 9,570 persons, p<.001), and a slight decrease was observed in the number of people hospitalized for schizophrenia (10,143 to 7,749 persons, p<.001).

The distribution of discharged patients in the Finnish Hospital Discharge Register is presented in Table 2 along with the time distribution of suicides in relation to discharge. Compared with the period 1995–2001, the period 1985–1991 showed a significantly greater risk of suicide both within a week after discharge (risk ratio [RR]=1.50, 95% confidence interval [CI]=1.38–1.62) and within a year after discharge (RR=1.25, 95% CI=1.19–1.30).

Despite the changes in the national suicide rate, the number of suicide victims with a recent psychiatric hospitalization has remained rather stable. A fifth of suicide victims from both samples had been psychiatrically hospitalized within the past year. As suggested by the general trend of shorter hospital stays, the treatment periods preceding suicides were significantly shorter in 1995–2001 com-

Table 2

Relative risk of suicide within a year for discharged patients in 1985–1991 and timing of postdischarge suicide

| | 1985–1991 | | | | 1995–2001 | | | | | |
| | Committed suicide with a discharge within a year (N=1,978) | | Discharged patients (N=163,236) | | Committed suicide with a discharge within a year (N=1,863) | | Discharged patients (N=191,764) | | Relative risk | 95% CI |
Variable	N	%	N	%	N	%	N	%		
Discharge diagnosis[a]										
Substance-related disorder	176	8.9	19,588	12.0	249	13.4	26,789	14.0	.97	.83–1.12
Schizophrenia or similar psychosis	704	35.6	72,604	44.5	491	26.4	63,837	33.3	1.26	1.17–1.36
Affective disorder	686	34.7	30,474	18.7	834	44.8	59,374	31.0	1.60	1.48–1.73
Neurotic- and stress-related or somatoform disorder	116	5.9	12,383	7.6	107	5.7	15,881	8.3	1.39	1.15–1.67
Personality disorder	189	9.6	13,193	8.1	138	7.4	10,358	5.4	1.08	.93–1.24
Other[b]	107	5.4	14,994	9.2	44	2.4	15,525	8.1	2.52	2.06–3.04
Any mental disorder	1,978	100.0	163,236	100.0	1,863	100.0	191,764	100.0	1.25	1.19–1.30
Time from discharge to suicide[b]										
0 to 7 days	652	33.0			512	27.5				
1 week to 1 month	252	12.7			282	15.1				
1 to 3 months	382	19.3			379	20.3				
3 to 6 months	342	17.3			344	18.5				
6 to 12 months	353	17.8			348	18.7				

[a] For patients with multiple psychiatric hospitalizations, the last available discharge diagnosis was used for classification; for the difference between the two time periods, χ^2=97.2, df=5, p<.001

[b] For the difference between the two time periods, χ^2=15.12, df=4, p<.005

pared with 1985–1991 (mean±SD of 45±340 days and a median of 14 days, compared with a mean of 98±558 days and a median of 20 days; F= 51.25, df=1 and 20, p<.001). As shown in Table 2, the distribution of diagnoses differed between the samples: schizophrenia spectrum disorders were less commonly treated in 1995–2001 than in 1985–1991 (26% compared with 36%) and affective disorders were more commonly treated (45% compared with 35%) (χ^2= 97.2, df=5, p<.001).

Among all patients hospitalized in psychiatric facilities, those committing suicide within one year of discharge constituted 1.3% (269 of 21,207) of all individual discharged psychiatric patients in 1985 and 1.0% (247 of 25,893) of all individual discharged psychiatric patients in 2000 (β=−27.3, p<.001). In the different diagnostic categories the relative suicide risk within one year of discharge among the earlier sample was 1.26 for hospitalized patients with schizophrenia and 1.60 for hospitalized patients with affective disorders (Table 2). The rate of immediate (within a week) suicides after treatment periods shorter than a week declined from .18% in 1985 to .07% in 2001.

Discussion

In analyzing the time periods 1985–1991 and 1995–2001 we found a cohort effect—that is, a decrease in both immediate (one week) and one-year postdischarge suicide risk among individuals who were psychiatrically hospitalized. This was somewhat contrary to what we expected, because we had hypothesized that changes in service provision would, as a result of premature discharges, lead to more suicides occurring immediately after hospital discharge.

The related psychiatric hospitalization data during the periods 1985–1991 and 1995–2001 indicated a change toward shorter hospitalizations, toward more treated individuals, and in the patient profile toward more individual patients hospitalized for affective disorders. These trends evidently reflect changes in clinical practice. Our results indicate that some positive elements in the development of psychiatric treatments have overcome the hypothetically risky consequences of shortening treatment periods. A possible explanation is that the decentralization of community mental health care has resulted in improved handling of patient transitions from hospital care to outpatient facilities. Particularly, the decrease in immediate (within a week) suicides after short treatments supports the idea of improved discharge practices, although changes in the target population may also contribute to this.

At the same time, as inpatient treatment periods are getting shorter, the number of patients who committed suicide within one year of psychiatric inpatient treatment has not increased as might have been expected. One relevant factor in this is that the general shortening of psychiatric hospitalizations has principally and appropriately been focused on patients who were not particularly at risk of postdischarge suicide. Discharge diagnoses suggest that deinstitutionalization has been accompanied by an increase in both the number of hospitalizations and the number of individ-

ual patients hospitalized for affective disorders.

According to our findings, the risk of suicide within one year of hospital discharge significantly decreased among patients treated for schizophrenia during a period of considerable downsizing of psychiatric hospital care. According to Roy and Draper (16), a third of suicides among previously hospitalized persons with schizophrenia were preceded by a hospitalization period that lasted longer than a year. In Denmark, the suicide rate among patients with schizophrenia has decreased within recent decades in parallel with the reduction in suicides in general (6). If extended or lengthy hospitalizations have carried an elevated risk of suicide in previous decades (16,17), perhaps a moderate shortening of psychiatric hospitalizations has contributed to a relative reduction of the postdischarge suicides associated with long hospitalizations of schizophrenia patients in particular. Although not assessed for the outcome of suicide, a carefully conducted deinstitutionalization process has been shown to produce mostly favorable outcomes for long-term patients discharged into community care (18).

Further study remains necessary to evaluate whether nursing shortages or other reductions in hospital resources specifically raise the risk of inpatient and postdischarge suicides, because findings of this kind have been reported (19). Our nationwide analysis was unable to pick up such hospital-specific outcomes. In general and in respect to outpatient care in particular, it has been suggested that up-to-date treatment practices have improved the quality of health care and are major contributing factors in reducing suicide rates (20). However, our data set cannot specify whether the decreased suicide risk is due to a generally improved prognosis in the hospital-treated psychiatric population or to improvements in mental health services.

Local coordination

The enhanced local coordination of discharge practices may have also acted toward a decrease in suicide risk, at least in individual cases. Novel treatment strategies or options among hospitalized psychiatric patients include active community-based programs, such as assertive community treatment, and the introduction of second-generation antipsychotic medications. However, a particularly significant reduction in the risk of suicide among patients with affective disorders might relate to better recognition of and treatment practices for depression. Some emerging evidence has suggested that the introduction of selective serotonin reuptake inhibitor antidepressants and related new medications has contributed to a decrease in suicide rates in many Western countries (21), but contradictory data have also been presented (22). Furthermore, contemporary psychosocial methods, including cognitive-behavioral psychotherapies, have reportedly reduced the incidence of suicide attempts among targeted populations (23). On the other hand, a U.S. study reported that despite the retrospectively assessed increase in activities for treating people with suicide ideation, suicide rates have not decreased between 1990–1992 and 2000–2002 (24).

Focus and outcomes

Regarding the focus and outcomes of our study, the Finnish health care system, which is mainly a public system, may provide some integrative elements in the treatment process that facilitate the successful transition of suicidal patients from inpatient to outpatient care providers. Finally, the antistigmatizing effect of better public awareness and acceptance of mental health issues may have benefited long-term psychiatric patients in terms of reduced risk of postdischarge suicide

The shortening of psychiatric inpatient treatment periods has not been associated with an increase in the occurrence of suicides and may have been one factor that has contributed to reducing postdischarge suicides among patients with schizophrenia and other patients. Mortensen and colleagues have stated that identifying and preventing the risk of suicides among patients with mental disorders admitted to hospitals may be among the most efficient strategies in this regard (1). This statement seems justified, because more than a third of the suicide victims in this study had been hospitalized at some point after 1969.

Seen over time, the slight increase in individual hospitalized patients in most diagnostic categories suggests that more patients have been treated, although the treatment periods were shorter. Perhaps the increase in the number of treated individuals has involved a greater number of patients with acute disorders in need of inpatient intervention as a result of crisis. Theoretically, this could account for a small part of the general decrease in suicide rates. Furthermore, these individuals may have been less severely psychiatrically disturbed, which would partly explain the relative decrease in postdischarge suicide risk in particular. Our findings regarding the distribution of diagnoses among treatment periods do not directly address issues related to severity or specific personality disorders, which remain to be examined in more detailed further studies.

Role of hospitalization

The role of psychiatric hospitalization appears to have shifted over time from a shelter function to being an integrated part of treatment, in which case patients nowadays may be less suicidal and their discharge does not necessarily constitute a substantial risk. However, as a clustering of suicides in the postdischarge period can still be seen, focusing on discharge practices and follow-up arrangements among certain patients seems justified (2). This could include a more immediate community follow-up and other safety measures, as suggested by Appleby and colleagues (25).

Our sample was unselected and included all psychiatrically hospitalized patients and all those who committed suicide. Thus the samples could not have reflected selection bias. However, in a retrospective setting certain methodological limitations need to be taken into account. The Finnish Hospital Discharge Register includes data on all inpatient treatment periods in Finland. Other personal histo-

ry, as well as any outpatient treatment data, is beyond the reach of this study. Furthermore, individual data on previously nonhospitalized suicide victims are limited to age, basic sociodemographic factors, and the suicide method.

On the other hand, combining data on all suicides with data on all inpatient treatment during the study period is fully representative of the relationship between hospitalizations and suicides. Register data were prospectively collected, and thus the data provide a follow-up type of study design, in which the annual rate of discharged individuals is combined with suicides occurring within a year after discharge. Thus changes in estimated risk of one-year postdischarge suicide can be calculated for all psychiatric inpatients, as well as separately for patients with different diagnoses.

The changes in the diagnostic classification system within the evaluation period did not seem to cause detectable changes in the frequency of diagnostic metacategories. Discharge diagnoses are given by psychiatrists or physicians on the basis of all available information and observations during inpatient stays. The accuracy of diagnoses and events in the Finnish Hospital Discharge Register has generally been considered good (26).

Conclusions

Our findings suggest that a reduced length of psychiatric hospitalization is not associated with an increase in immediate postdischarge suicides. We found that with the shortened hospital stays, suicide risk was reduced both among patients with schizophrenia and affective disorders. Although further causal evidence is still needed, it is possible that patients in certain categories, such as patients with schizophrenia, may benefit from shorter hospital stays. Although the role of psychiatric hospitalization in general may have changed over time, patients currently in treatment may be less suicidal immediately after discharge. Although shorter hospital treatment periods have not increased the risk of postdischarge suicide, a significant

clustering of suicides in the postdischarge period remains, thus justifying renewed focus on the discharge practices and immediate follow-up arrangements for discharged patients. Regarding suicide prevention, there is still a substantial need for a better recognition of suicidal risk among psychiatric patients during a period of decreasing use of psychiatric hospitalization. Our results indicate that in terms of postdischarge suicides, the downsizing of psychiatric hospitals has been a success.

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