Suicide Risk Factors in Patients Recently Discharged From a Psychiatric Hospital: A Case-Control Study

Eberhard A. Deisenhammer, MD[a,*]; Elisa-Marie Behrndt, MSc[a,b]; Georg Kemmler, PhD[a]; Christian Haring, MD[c]; and Carl Miller, MD[d]

ABSTRACT

Objective: The first weeks after discharge from a psychiatric hospital constitute a period of considerably increased risk for suicide. Most studies on risk factors have investigated a relatively long time frame after discharge or have identified unmodifiable factors. This case-control study focused on factors describing the interaction between patient and hospital and studied variables during the entire course of the hospital stay.

Methods: Suicide cases were identified by linking the Tyrol Suicide Register (all suicides occurring in the Austrian state of Tyrol) with the registers of the 3 psychiatric hospitals in the state. Postdischarge suicide cases were defined as suicides occurring within 12 weeks after discharge. Control subjects were patients who had also been inpatients in the respective psychiatric unit but had not committed suicide. Matching variables included sex, age, hospital, diagnosis, and date of discharge. The study period comprised 7 years (February 1, 2004–January 31, 2011).

Results: A total of 89 suicide cases and 144 controls were included. Factors differentiating cases from controls included a history of suicidal behavior or threats (odds ratio [OR] = 4.65; $P < .001$), depressive symptoms (OR = 3.63; $P = .004$) and disordered thought content (OR = 2.68; $P = .001$) at admission, admission mode (patient self-referral less often [OR = 0.28; $P = .009$]), a change from one ward to another (OR = 1.87; $P = .035$), discharge initiated by the patient (OR = 10.34; $P = .013$), depressive symptoms at this point in time (OR = 4.42; $P < .001$), discharge mode (less often into institutional care [OR = 0.17; $P = .002$]), and linkage with postdischarge care (fixed appointment with a general practitioner less often [OR = 0.53; $P = .024$]).

Conclusions: The results of this study point to suicide preventive measures that may be implemented during and after hospitalization, including clear information transfer in case of unavoidable ward change and optimization of follow-up care organization.

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[a]Department of Psychiatry and Psychotherapy, Medical University of Innsbruck, Innsbruck, Austria

[b]Department of Psychiatry and Psychotherapy, Center for Health Services Research in Medicine, Erlangen, Germany

[c]Department of Psychiatry and Psychotherapy B, State Hospital Hall in Tirol, Hall in Tirol, Austria

[d]Department of Psychiatry, County Hospital Kufstein, Kufstein, Austria

**Corresponding author:* Eberhard A. Deisenhammer, MD, Department of Psychiatry and Psychotherapy, Medical University of Innsbruck, Anichstr. 35, 6020 Innsbruck, Austria (eberhard.deisenhammer@i-med.ac.at).

A history of a psychiatric disorder (particularly a current illness episode) is one of the most important risk factors for suicide.[1–3] Practically all psychiatric diagnoses are associated with an increased risk.[4–6]

While the inpatient suicide rate (ie, during hospitalization) has been calculated at 147 per 100,000 inpatient years,[7] the first weeks after discharge from a psychiatric hospital have repeatedly been reported to be a period of even higher risk.[8–14] A recent meta-analysis[15] calculated a suicide rate of 1,123 per 100,000 person years for the first 3 months after discharge.

In a nationwide register study, Qin and Nordentoft[16] reported a particularly high risk for the first week, but the risk seems to remain elevated for at least 1 year after discharge.[17] In a previous study, we found hospitalization rates and the mean number of hospitalizations during the last 3 months before suicide to be significantly higher than during the 9 preceding months.[18] Patients recently discharged from their first inpatient psychiatric treatment have an increased risk for all-cause mortality within 1 year, with suicide being the leading cause of death in this population.[19] Compared with inpatient suicides, the postdischarge suicide sample had a 3-fold rate per 100,000 admissions within a comparable observation period.[20]

The increased suicide risk during the first weeks after discharge from a psychiatric hospital may partially be explained by the fact that being discharged from hospital often means the end of a kind of "timeout" from everyday problems. Returning home then may possibly be associated with the reemergence of stressors that existed prior to hospitalization and with additional stressors that were prompted or exacerbated by hospitalization.[21] Moreover, the perception that the hospital stay did not yield the desired resolution of problems may contribute to a feeling of hopelessness. In addition, most patients are not entirely remitted at the time of discharge and may thus be particularly vulnerable to any stressor in this period. Sometimes, patients themselves ask for a (potentially too) early discharge, but economy-related hospital decisions may also play a role. Kapur et al[22,23] contrasted falling inpatient suicide rates with increasing postdischarge rates in England and Wales and speculated on a transfer of risk from hospital to other clinical settings. Such a shift, however, was not found for Denmark, where both rates declined during the same period,[24] nor for Finland.[25,26]

Most studies on risk factors for postdischarge suicide so far have investigated a time frame of 1 year after discharge[17,27–29] or focused primarily on hospital characteristics.[30,31] Moreover, many risk factors identified are of limited specificity or not

Clinical Points

- Suicide after discharge from a psychiatric hospital is a major but understudied issue in clinical psychiatry. Identifying patients at risk may contribute to suicide prevention.
- During hospitalization, a clear information policy in case of an unavoidable ward change should be established.
- At discharge, optimized follow-up care organization is of utmost importance.

modifiable. Thus, there is still a need for focusing on the circumstances of postdischarge suicides.

In this study, we investigated risk factors for suicide within 12 weeks after discharge from psychiatric hospital during the entire course of the hospital stay (ie, clinical history, mode of and symptomatology at admission, phase of hospitalization, and circumstances at discharge) comparing postdischarge suicides with closely matched control patients.

METHODS

Suicide data were obtained from the Tyrol Suicide Register (TSR), in which all suicides occurring in the Austrian state of Tyrol are documented on a personalized basis. The study period comprised 7 years, from February 1, 2004, to January 31, 2011. For this period, a total of 775 suicides are captured in the TSR. These suicide data were linked with the hospital registers of the (at that time) 3 psychiatric units in Tyrol (a university hospital in Innsbruck [UHI], a state hospital in Hall in Tirol [SHH], and a county hospital in Kufstein [CHK]).

Postdischarge suicide cases were defined as suicides that occurred within 12 weeks after discharge from one of the psychiatric units. A total of 89 cases (11.5% of the total) were identified with this strategy, corresponding with a rate of 135.6 postdischarge suicides per 100,000 admissions. Control subjects were patients who had also been inpatients in the respective psychiatric unit but had not committed suicide. A close matching strategy was chosen using the following variables: sex, age (± maximum of 9 years), hospital (UH Innsbruck, SH Hall, or CH Kufstein), diagnosis at discharge (according to *ICD-10* chapters; F1, F2, F3...), and discharge date (± maximum 1 week). This matching strategy on the one hand ruled out potentially interesting (but not modifiable) risk factors but on the other hand allowed the focus to be specifically on clinical variables marking the patients' course during the hospital stay. For each case, the respective closest potential controls were chosen. Due to the thorough matching strategy, it was not, as initially intended, possible to identify 2 controls for each case. Still, we were able to include a total of 144 controls.

Patient- and admission-related data were extracted from available hospital records (eg, admission record, assessment for restraint measures, discharge letter) and included sociodemographic and clinical history variables, symptoms at admission, mode of admission, treatment variables, last record of psychopathology, and discharge variables. Data were extracted by 1 author only (E.-M.B.), a psychologist clinically trained to assess psychopathologic alterations.

The study procedure was approved by the Ethics Committee of the Medical University of Innsbruck.

Statistical Analysis

The 2 groups (postdischarge suicides and controls) were compared with regard to the relevant sociodemographic, clinical, and admission-related variables by means of the appropriate 2-sample tests. The χ^2 test was applied for categorical variables, and the Student *t* test or Mann-Whitney *U* test was applied for continuous variables depending on their distribution (approximately normal or non-normal, respectively). The χ^2 test was also used to compare suicide rates between hospitals. Odds ratios were calculated to quantify group differences in binary variables. Cohen *d* was used as an effect size measure for metric variables.

RESULTS

The male-to-female ratio in both groups was 1.6:1. Further details on demographic and clinical data including matching variables are given in Table 1. Group differences were not significant.

The mean time between discharge and suicide was 25.9 days. Thirty-eight suicides (42.7%) occurred within the first 2 weeks after discharge and 51 (57.3%) within 4 weeks.

Most suicides occurred after discharge from the largest unit, SHH. In relation to numbers of admissions, we found a significantly lower rate for the university hospital (47.3 per 100,000 admissions) than for the other hospitals (SHH, 204.1 [$P < .001$ vs UHI]; CHK, 173.4 [$P = .002$ vs UHI] per 100,000 admissions, respectively).

Variables grouped according to phase of hospital stay (ie, clinical history, admission, course of hospital stay, day of discharge) are displayed in Tables 2 and 3. In brief, patients who committed suicide had significantly more often a history of any suicidal behavior (suicide attempts, aborted attempts, threats). They were more likely to show depressive symptoms and disordered thought content at admission. Further, they were more often brought to the hospital by ambulance and had less often come by themselves. During the hospital stay, they had more often been transferred from one ward to another. The discharge had more often been initiated by the patient, and they had more often a record of depressive symptoms at this point in time. Patients who committed suicide after discharge were more often discharged into their families than into institutional care and less often had an appointment with a nonpsychiatric physician/general practitioner.

DISCUSSION

In this study of patients who committed suicide within 12 weeks after discharge from a psychiatric hospital compared

Table 1. Demographic and Clinical Data of Suicide and Control Patients

Variable	Postdischarge Suicides (n = 89)[a]	Controls (n = 144)[a]	Test Statistic (χ^2 or t)	P Value
Sex, males/females	55 (61.8)/34 (38.2)	89 (61.8)/55 (38.2)	$\chi^2 = 0.001$	.998
Age, mean ± SD , y	50.4 ± 15.2	48.3 ± 13.8	$t = 1.090$	.277
Hospital			$\chi^2 = 1.086$	.581
UH Innsbruck	13 (14.6)	20 (13.9)		
SH Hall	65 (73.0)	112 (77.8)		
CH Kufstein	11 (12.4)	12 (8.3)		
Main diagnosis at discharge (*ICD-10* chapters)			$\chi^2 = 0.998$	.963
F0	4 (4.5)	6 (4.2)		
F1	13 (14.6)	21 (14.6)		
F2	10 (11.2)	17 (11.8)		
F3	42 (47.2)	74 (51.4)		
F4	15 (16.9)	21 (14.6)		
F6	5 (5.6)	5 (3.5)		
Suicide method				
Hanging	31 (34.8)			
Jumping from a height	16 (18.0)			
Jumping in front of a train	13 (14.6)			
Days between discharge and suicide, mean ± SD	25.9 ± 22.0			

[a]Values expressed as n (%) unless otherwise noted.
Abbreviations: CH = County Hospital, SH = State Hospital, UH = University Hospital.

Table 2. Preadmission Clinical History, Symptoms at Admission, and Mode of Admission[a]

Variable	Postdischarge Suicides (n = 89)[a]	Controls (n = 144)[a]	Effect Size (Cohen d or OR)	95% Confidence Interval	P Value[b]
Preadmission clinical history					
No. of previous admissions, mean ± SD	4.4 ± 7.5	5.7 ± 8.0	$d = -0.17$	−0.44 to 0.10	NS
History of attempted suicide	41 (46.1)	15 (10.5)	OR = 7.29	3.70 to 14.36	.018
Aborted suicide attempt	14 (16.1)	3 (2.1)	OR = 8.89	2.47 to 31.92	< .001
Any suicidal behavior/threats	59 (67.8)	43 (31.2)	OR = 4.65	2.62 to 8.28	< .001
Symptomatology at admission					
Suicidality	23 (26.1)	26 (18.4)	OR = 1.56	0.83 to 2.96	NS
Anxiety	33 (37.5)	43 (30.9)	OR = 1.34	0.76 to 2.35	NS
Depressive symptoms	82 (93.2)	113 (79)	OR = 3.63	1.44 to 9.12	.004
Acute stressor (partnership, work, death)	50 (56.8)	62 (44.6)	OR = 1.63	0.95 to 2.80	NS
Currently under the influence of alcohol	13 (14.6)	29 (20.3)	OR = 0.67	0.33 to 1.38	NS
Other substances	4 (4.5)	16 (11.1)	OR = 0.38	0.12 to 1.17	NS
Thought disorder (content)	33 (37.9)	26 (18.6)	OR = 2.68	1.46 to 4.92	.001
Cognitive impairment	51 (58.6)	89 (62.7)	OR = 0.84	0.49 to 1.46	NS
Aggression	13 (14.8)	32 (22.2)	OR = 0.61	0.30 to 1.23	NS
Mode of admission					
Ambulance	37 (41.6)	38 (26.4)	OR = 1.98	1.13 to 3.84	.016
Police	7 (7.9)	16 (11.1)	OR = 0.68	0.27 to 1.73	NS
Involuntary admission	11 (12.4)	15 (10.4)	OR = 1.21	0.53 to 2.77	NS
Referral by physician	75 (84.3)	111 (77.1)	OR = 1.59	0.80 to 3.28	NS
Referral from another psychiatric unit	3 (3.4)	0 (0.0)	…[c]	…[c]	NS
Referral from a nonpsychiatric unit	17 (19.1)	18 (12.5)	OR = 1.65	0.80 to 3.41	NS
Self-referral by patient	5 (5.6)	25 (17.4)	OR = 0.28	0.10 to 0.77	.009
Patient accompanied	27 (30.7)	36 (25.0)	OR = 1.33	0.74 to 2.39	NS

[a]Values expressed as n (%) unless otherwise noted.
[b]Mann-Whitney U test (number of previous admissions) or χ^2 test (all other variables).
[c]Odds ratio undetermined.
Abbreviations: NS = nonsignificant ($P > .05$), OR = odds ratio.

with sex-, age-, hospital-, diagnosis- and date of discharge–matched controls, a number of factors associated with risk of suicide were identified.

A history of suicidal ideation and/or behavior (including suicide attempts as well as suicidal thoughts) has repeatedly been reported as a suicide risk factor in both nonhospitalized[32–34] and hospitalized[35,36] patients. Prior suicidality, particularly suicide attempts, was also found in a number of studies focusing on the risk of suicide after psychiatric discharge in various patient populations.[29,37–40] Our finding of an association of previous suicide attempts, aborted attempts, and suicidal threats with postdischarge suicide risk thus confirms the importance of including the assessment of previous suicidality into the intake interview as a standard procedure.

Current suicidality at admission, which has been reported as a risk factor in previous postdischarge suicide studies,[15,28,41] was numerically (although not significantly) more prevalent in the suicide patients group in our investigation, too. Clearly, suicidality is an indispensable constituent of the psychiatric intake interview, and it appears to be necessary to keep the information on previous

Table 3. Factors During Hospitalization, Circumstances of and Symptoms at Discharge, and Discharge Management

Variable	Postdischarge Suicides (n = 89)[a]	Controls (n = 144)[a]	Effect Size (Cohen *d* or OR)	95% Confidence Interval	*P* Value[b]
Factors during hospitalization					
Duration of hospitalization, mean ± SD, d	18.7 ± 15.2	22.8 ± 17.8	*d* = −0.24	−0.51 to 0.03	NS
Days in closed unit, mean ± SD	8.1 ± 9.7	8.4 ± 9.1	*d* = −0.03	−0.30 to 0.24	NS
Initially closed unit	24 (27)	32 (22.2)	OR = 1.29	0.70 to 2.38	NS
Change between wards	31 (34.8)	32 (22.2)	OR = 1.87	1.04 to 3.36	.035
Refusal of therapeutic interventions	23 (26.7)	27 (18.9)	OR = 1.57	0.83 to 2.96	NS
Life event	2 (2.4)	1 (0.7)	OR = 3.45	0.31 to 38.5	NS
Prospective plans (working situation, housing, partnership)	83 (94.3)	140 (97.2)	OR = 0.47	0.12 to 1.82	NS
Circumstances of and symptoms at discharge					
Regular discharge	61 (68.5)	114 (79.2)	OR = 0.57	0.31 to 1.05	NS
Discharge at patient's wish	18 (20.2)	18 (12.5)	OR = 1.78	0.87 to 3.63	NS
Discharge against medical advice	4 (4.5)	11 (7.6)	OR = 0.57	0.18 to 1.84	NS
Hospitalization terminated by patient	6 (6.7)	1 (0.7)	OR = 10.34	1.22 to 87.35	.013
Improvement of mood	74 (92.5)	134 (97.8)	OR = 0.28	0.07 to 1.14	NS
Depressive symptoms	23 (30.7)	12 (9.1)	OR = 4.42	2.05 to 9.55	< .001
Suicidal ideation	0	0 (0.0)	…[c]	…[c]	NS
Anxiety	3 (4.0)	4 (3.0)	OR = 1.35	0.30 to 6.22	NS
Aggression	1 (1.2)	3 (2.2)	OR = 0.57	0.06 to 5.54	NS
Thought disorder (content)	2 (2.7)	4 (2.9)	OR = 0.92	0.16 to 5.13	NS
Comorbid diagnosis	51 (57.3)	86 (59.7)	OR = 0.91	0.53 to 1.56	NS
Discharge management					
Living conditions after discharge					
Alone	17 (22.7)	26 (20.5)	OR = 1.14	0.57 to 2.27	NS
Family	55 (73.3)	76 (59.8)	OR = 1.84	0.98 to 3.44	NS
Institutional care (eg, therapeutic residential community)	3 (4.0)	25 (19.7)	OR = 0.17	0.05 to 0.58	.002
Refusal of therapeutic aftercare	15 (17.4)	15 (10.6)	OR = 1.77	0.82 to 3.84	NS
Appointment with psychiatrist	72 (80.9)	121 (84.0)	OR = 0.81	0.40 to 1.61	NS
With psychotherapist	26 (29.2)	34 (23.6)	OR = 1.33	0.73 to 2.43	NS
With psychosocial care	24 (27.0)	52 (36.1)	OR = 0.65	0.37 to 1.17	NS
With nonpsychiatric physician (GP)	31 (34.8)	72 (50.0)	OR = 0.53	0.31 to 0.92	.024

[a]Values expressed as n (%) unless otherwise noted.
[b]Mann-Whitney *U* test (number of previous admissions) or χ^2 test (all other variables).
[c]Odds ratio undetermined.
Abbreviations: GP = general practitioner, NS = nonsignificant (*P* > .05), OR = odds ratio.

and current suicidality in mind during the entire stay of the patient until the discharge interview.

In our study, depressive symptoms and disordered thinking at admission were significantly more frequent in the suicide group. The importance of psychotic features for suicide risk in depressed patients has repeatedly been emphasized,[42–44] and psychotic experiences generally are associated with subsequent suicidal ideation and behavior.[45] Specifically in postdischarge suicide, Thong et al[11] reported delusions as a main risk factor.

Patients who later committed suicide had been significantly more often taken to the hospital by an ambulance and less often referred themselves for admission. This finding may on the one hand be associated with the factor "thought disorder" mentioned above and on the other hand reflect the importance of the willingness of a patient to seek help in order to establish a helpful therapeutic relationship, which in turn is of major relevance for suicide prevention.[46] It further underlines the necessity to improve preclinical skills (of, eg, general practitioners, family members, friends) to identify individuals at risk for suicide and encourage them to contact mental health facilities.

Of the variables regarding the phase of hospitalization, a change between wards was significantly more often documented in the suicide group. There are a number of potential reasons for the necessity of a change of a patient from one ward to another, and often it is unavoidable. However, in most cases, it means a disruption of personal relationships, be it with nursing staff, physicians, therapists, or other patients. Discontinuity of care from a significant professional has been reported as a risk factor for suicide within 1 year after discharge[27] as well as for inpatient suicides.[47] In case a change in the therapeutic environment is necessary, informing the patient openly and transparently about the circumstances as well as passing on the relevant information between staff members appear to be of utmost importance.[48]

In the last record before discharge, depressive symptoms were significantly more often documented in the suicide group. On the one hand, depression—either as part of an affective disorder or as a syndrome comorbid with other psychiatric diagnoses—is a well-known risk factor for suicide.[6,49–51] On the other hand, the finding of persisting depressive symptoms at the time shortly before discharge further underlines the importance of the association of incomplete remission of depression with persistence of suicidality.[52] Since it is often not possible to achieve full symptomatic remission during hospitalization, continuation of therapeutic care including assessment of suicidal tendencies after discharge constitutes a major aspect in the prevention of postdischarge suicides.

Although occurring in a limited number of patients only (6 vs 1), termination of the hospitalization by the patient was significantly more frequent in the suicide group. Both initiation of own discharge and discharge against medical advice have repeatedly been described as a risk factor for later suicide.[12,30,53,54] Thus, when confronted with the wish for preterm discharge, doctors have to check for current suicidality (and the potential risk for its emergence when the patient returns home where preexisting and unsolved problems may persist). In case a potentially suicidal patient terminates the hospital stay without consulting the staff and contact (eg, via cellphone) cannot be established, a search by police should be considered.

Patients who were discharged into institutional care compared to living alone or with family were at lower risk to die from suicide within 12 weeks after discharge. It appears that the respective institutions (in most cases, therapeutic residential communities) that are intended to provide a supporting and "holding" environment actually constitute a suicide-protective one, even though in the majority of these institutions in Tyrol caregivers are present on only a part-time basis. This conclusion is even more compelling when assuming that it is most likely the more severely ill and therefore higher risk patients who are admitted to professional social aftercare.

While there were no differences in the rates of appointments made with psychiatrists or psychotherapists for outpatient treatment after discharge, patients who died of suicide in this period were significantly less likely to leave the hospital with an appointment with a nonpsychiatric physician, most commonly a general practitioner. This finding points on the one hand again to the importance of establishing a sound plan for aftercare at the time of discharge. Psychiatric patients may have illness- as well as stigma-related difficulties with contacting a doctor after discharge by themselves. It may therefore be a relief for them to have a fixed appointment with the physician who is supposed to have the highest contact frequency with the patient in the near future. On the other hand, it underlines the role of the general practitioner for suicide prevention in general.[55,56] Olfson et al[57] identified absence of any outpatient health care in the 6 months preceding hospital admission as a risk factor for postdischarge suicide, and Nordentoft et al[58] stated that outpatient treatment should be introduced before discharge.

The finding of a significantly lower postdischarge suicide rate in patients who had been hospitalized in the university hospital compared to both the state and the county hospitals was at first view unexpected given the regional organization of inpatient mental health care in Tyrol. Due to the generally residence-based allocation of patients requiring a psychiatric hospitalization, the diagnostic composition of the patient populations admitted to one of the 3 hospitals in this study should have been more or less identical. Moreover, it contradicts the finding of a Taiwanese study by Lin et al.[30] However, the university hospital is located in the state's capital, Innsbruck, where the density of psychiatrists and psychotherapists is higher than in predominantly rural regions, making it easier to establish an aftercare setting.

The strengths of this study include the reliable study period of 12 weeks after discharge, the high number of factors investigated over the entire course of the patients' hospital stay, and a thorough matching strategy ensuring the focus on clinical data related to the interplay between patient and hospital. This strategy, however, reduced the number of suitable controls. Further limitations include the relatively low number of suicide cases, the lack of blinding of the data extractor with regard to the case/control status, and the, in parts, incomplete data documentation in the patient records.

Postdischarge suicides constitute a major focus for suicide prevention measures, be it the identification of patients at increased risk or the interplay between hospital care and the management of aftercare. Kapur et al,[22,23] when discussing the potential of a transfer of suicide risk from the inpatient treatment phase to the period after discharge, emphasized the importance of high-quality aftercare following discharge from a psychiatric hospital. The results of the present study provide clues to enhance the efforts to reduce suicides in patients recently discharged from a psychiatric hospital.

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Editor's Note: We encourage authors to submit papers for consideration as a part of our Focus on Suicide section. Please contact Philippe Courtet, MD, PhD, at pcourtet@psychiatrist.com.