

Systematic Suicide Risk Assessment for Patients With Schizophrenia: A National Population-Based Study

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Objectives: Systematic suicide risk assessment is recommended for patients with schizophrenia; however, little is known about the implementation of suicide risk assessment in routine clinical practice. The study aimed to determine the use of systematic suicide risk assessment at discharge and predictors of suicide attempt among hospitalized patients with schizophrenia in Denmark. **Methods:** A one-year follow-up study was conducted of 9,745 patients with schizophrenia who were discharged from psychiatric wards and registered in a national population-based schizophrenia registry between 2005 and 2009. **Results:** The proportion of patients receiving suicide risk assessment at discharge from a psychiatric ward increased from 72% (95% confidence interval [CI]=71%–74%) in 2005, when the national monitoring began, to 89% (CI=89%–90%) in 2009. Within one year after discharge, 1% of all registered patients had died by suicide and 8% had attempted suicide. One out of three patients who died by suicide had no documented suicide risk assessment before discharge. **Conclusions:** The use of systematic suicide risk assessment at discharge among patients with schizophrenia increased in Denmark between 2005 and 2009, in accordance with recommendations in national clinical guidelines and monitoring in a national clinical registry. Additional efforts are warranted to ensure a lower risk of suicidal behavior after hospital discharge. (*Psychiatric Services* 65:226–231, 2014; doi: 10.1176/appi.ps.201200021)

In recent years, international and Danish clinical guidelines for schizophrenia treatment have recommended suicidal behavior screening (1–4). Prevention of suicide and attempted suicide among individuals with schizophrenia has been a key objective in psychiatry for several years

because of the increased risk of suicidal behavior in this population; 80% of individuals with schizophrenia describe thoughts of suicide (5), up to 60% make at least one suicide attempt (6), and 5%–7% eventually die by suicide (7–10).

Increased clinical attention to suicide risk assessment guidelines could

identify individuals at high risk of suicidal behavior and may be considered a targeted suicide prevention strategy among individuals with schizophrenia. However, data on implementation and effect of systematic suicide risk assessment are lacking. Although predicting who will engage in suicidal behavior among even a high-risk group of patients is complex (6), systematic suicide risk assessment is recommended in the clinical guidelines for treatment of schizophrenia and therefore warrants evaluation. An examination of the implementation of these guidelines is crucial to understanding the value and effectiveness of the current components of psychiatric health care and developing the care provided to patients with schizophrenia.

The aim of this study was to examine the use of suicide risk assessment among hospitalized patients with schizophrenia in Denmark.

Methods

This national follow-up study was based on data from Danish health care registries. The Danish health care system provides tax-paid health care to the country's 5.5 million residents, all of whom have free access to hospital care and general practitioners. Patients with schizophrenia are exclusively admitted to public psychiatric hospitals. The entire population is covered by a large number of administrative and medical registries, which are used for monitoring and regulating all central aspects of the public sector, including the health

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care system. Through the use of a civil registry number, which is unique to each Danish citizen, unambiguous linkages between the population-based registers can be made.

Danish National Indicator Project for Schizophrenia (DNIP)

The DNIP is a national population-based schizophrenia registry containing data from all psychiatric treatment units in Denmark on quality of care for patients with schizophrenia. Participation in the DNIP is mandatory for all Danish psychiatric hospitals and units treating patients with schizophrenia, defined by codes F20.0–F20.9 in the *International Classification of Diseases, Version 10 (ICD-10)* (11). The registry was designed to document, monitor, and improve care provided within the Danish psychiatric health care system for patients with schizophrenia by using evidence-based quality-of-care indicators relevant to psychiatric practice. The indicators were established by a national expert panel that included physicians, psychologists, nurses, occupational therapists, and social workers. The DNIP was established through the concerted efforts of the Ministry of Health, the National Board of Health, the Danish Regions, health care professional organizations, and scientific societies (12,13). Data collection was initiated in 2004, is ongoing, and includes data on patient characteristics for all inpatients and outpatients. In 2009, the DNIP included 98% of all inpatients with a schizophrenia diagnosis compared with administrative hospital discharge registries covering all hospitalizations in Denmark (14).

Study population

We included all adult patients (≥ 18 years) with schizophrenia, according to *ICD-10* codes F20.0–F20.9, who were discharged from psychiatric inpatient treatment and registered in the DNIP between April 1, 2005, and March 31, 2009. A total of 9,745 individual patients were included, and among those, newly diagnosed cases of schizophrenia were registered for 1,821 (18.7%), meaning a first-time diagnosis of schizophrenia 12 months before discharge. Each patient was included only once in the study.

Suicide risk assessment

Suicide risk assessments have been registered in the DNIP since April 1, 2005. An assessment is defined as a psychiatrist's clinical identification of the patient's level of depression symptoms, thoughts of suicide, history of suicidal behavior, and risk of suicidal behavior. Psychiatrists are required to document a suicide risk assessment in the patient's medical record within one week before the patient's discharge from a psychiatric ward, and the staff caring for the patient must report completion of the assessment directly to the DNIP registry. The results of the risk assessment are not noted in the DNIP registry. This study is based exclusively on the data reported to the DNIP.

Suicidal behavior

All patients were followed for suicidal behavior for 12 months after discharge by linking the DNIP to the Danish Registry of Causes of Death, the National Patient Registry, and the Danish Psychiatric Central Research Register.

Causes of death. The Danish Registry of Causes of Death contains information about causes of death since 1970 and was used to obtain data on completed suicide after discharge from a hospitalization. All causes of death are coded in the registry with *ICD-10* codes, and the manner and date of death are also recorded. In this study, causes of death were limited to *ICD-10* codes V01–Y98 (external causes of mortality). Data from the registry were available only until December 31, 2008, at the time of the linkage with the DNIP.

National Patient Registry. The National Patient Registry includes information about somatic hospitalizations in Denmark since 1977 and was used to obtain data on suicide attempts registered by somatic emergency wards after hospital discharge. Since 1995, data for outpatient and emergency departments have been included in the registry (15). Available data include dates of admission and discharge and discharge diagnoses (coded as 4 in the registry).

Central Research Register. The Danish Psychiatric Central Research

Register contains information regarding treatment at psychiatric hospitals since 1968 (16) and was used to obtain data on suicide attempts (*ICD-10* codes X60–X84). This registry also contains data on admission and discharge dates as well as discharge diagnoses.

Covariates

We obtained information on a range of patient- and treatment-related covariates from the DNIP registry, including sex, age, substance abuse (cannabis, benzodiazepines, opioids, central nervous system-stimulating drugs, and other street drugs), Global Assessment of Functioning (GAF) score (17), treatment with antipsychotic medication, patients' contact with relatives during the hospitalization, and psychoeducation during the hospitalization. In addition, for patients with new diagnoses, we obtained data on psychopathology assessments performed by medical specialists, psychopathology assessments performed by an interview test (Schedules for Clinical Assessment in Neuropsychiatry or Present State Examination), cognitive tests performed by psychologists, and contact with a social worker.

Statistical analysis

We first examined changes in overall use of systematic suicide risk assessment during the study period and then compared the covariates among patients with and without a suicide risk assessment. Logistic regression was used to examine the association between the covariates and the use of systematic suicide risk assessment by computing crude and adjusted odds ratios (ORs) with 95% confidence intervals (CIs).

Before analyzing the association between suicide risk assessment and each covariate, we used a multiple imputation procedure to impute missing values of the patient- and treatment-related covariates and suicide risk assessment, assuming that data were missing at random. We imputed 50 data sets using the covariates and suicide risk assessment; subsequently, means of the estimates for each covariate and suicide risk assessment were used in a logistic regression analysis (18). Comparison

of the original and imputed data sets showed no major differences in the distribution of the data, which was an indication that data were robust (not shown). All analyses were conducted with Stata, version 11.0.

Results

Data on suicide risk assessment were available for 7,107 of the 9,745 included patients (73%). Overall, 79% of all patients with available data had been systematically assessed for suicide risk in the study period (Table 1). The proportion of patients being assessed for suicide risk increased steadily during the period between 2005 and 2009, from 72% (CI=69%–71%) in 2005, when the national monitoring started, to 89% (CI=87%–89%) in 2009 ($p<.001$) (Figure 1).

Males were less likely than females to be assessed for suicide risk (adjusted OR [AOR]=.78, CI=.68–.90), and persons over age 30 were less likely than those younger than 30 to receive a suicide risk assessment, because the trend for odds decreased with increasing age (ages 30–39, AOR=.86; ages 40–49, AOR=.86; ages 50–59, AOR=.76; and ages ≥ 60 , AOR=.60).

Patients who abused alcohol or drugs (except abusers of benzodiazepines and central nervous system-stimulating drugs) were less likely to receive a suicide risk assessment than those who did not abuse alcohol or drugs (AORs ranged from .67 for abuse of other street drugs to .96 for abuse of alcohol). However, only abuse of other street drugs was statistically significantly different compared with no abuse ($p=.04$). Persons with a GAF score ≥ 30 were more likely to receive a suicide risk assessment than those with a GAF score of <30 (AORs ranged from 1.57 for a GAF score of 40–49 to 1.64 for a GAF score of 30–39). Receiving psychoeducation during hospitalization was also associated with increased odds of suicide risk assessment before hospital discharge (AOR=1.89) (Table 1).

Incident (new) schizophrenia cases constituted 19% (N=1,821) of the study population. Sixty-four percent (N=1,162) were assessed for suicide risk, and approximately 23% (N=414) had missing information on suicide

risk assessment (Table 2). Patients who received a psychopathology assessment performed by a medical specialist (AOR=1.47, $p=.07$) or by interview test (AOR=1.57, $p=.02$) were more likely to receive a suicide risk assessment than patients who did not receive such assessments, but the difference was not statistically significant for assessments performed by medical specialists. Patients newly diagnosed as having schizophrenia who received a cognitive test were also more likely than patients who did not to receive a suicide risk assessment (AOR=1.56, $p=.01$).

We found no substantial differences in the analyses based on the original and the imputed data sets, respectively (data not shown).

Approximately 1% (N=64) of the patients died by suicide, and 8% (N=427) attempted suicide in the first 12 months after hospital discharge. A majority of suicides were completed by men (74%, N=47), whereas women constituted a majority of suicide attempts (74%, N=316). Among those who died by suicide, 66% (N=42) had received a documented suicide risk assessment, whereas no assessment had been made or data were missing for the other patients. Approximately 10% (N=6) of the completed suicides occurred in the first week after discharge, and of those 50% (N=3) had received a systematic risk assessment. With regard to persons who had attempted suicide, 73% (N=313) had received a suicide risk assessment before discharge. Approximately 9% (N=37) of the attempted suicides occurred within the first week of discharge, and of these 70% (N=26) of the patients had been assessed for suicide risk before discharge (data not shown).

Discussion

The use of systematic suicide risk assessment among patients with schizophrenia at the time of discharge from a psychiatric ward increased in Denmark between 2005 and 2009, following recommendations in national clinical guidelines and monitoring in a national clinical registry. Still, a substantial proportion of patients, including patients who were expected to be at the highest risk of suicide

(specifically, males and patients with new schizophrenia diagnoses), did not appear to receive a systematic assessment before hospital discharge despite clear recommendations in the clinical guidelines (19,20).

Implementation of clinical treatment guidelines is complex, and several studies have concluded that adherence to guidelines in psychiatric care is often low (21–23). Differences have been found between psychiatry and somatic specialties in the attitudes and knowledge about guidelines and evidence-based medical practices, some of which are explained by lack of a tradition of following clinical guidelines in psychiatric treatment (24). Bauer (25) reviewed the adherence to mental health clinical guidelines and found adequate adherence in only 27% of the observational studies and 67% of the controlled trials. Six barriers to adherence to recommended clinical guidelines in health care in general have been identified: lack of awareness of existing guidelines, lack of familiarity with guidelines, lack of agreement with guidelines, lack of self-efficacy in providing certain treatments, low outcome expectancy from treatment, and inertia concerning previous practice (26). These barriers may also explain the lack of adherence to guidelines in psychiatric care. In addition, Azocar and colleagues (22) found that among clinicians failing to follow clinical guidelines for treatment of major depression, 96% stated they were too busy to read the guidelines and 38% reported they did not want to be told how to practice by managed care organizations.

Despite the recommendations for the use of systematic suicide risk assessment, the predictive value of the risk assessment is modest due to the high prevalence of the assessment of risk factors and the low rate of suicidal behavior (27). Systematic suicide risk assessment should therefore be used with caution to guide clinicians and patients but should not stand alone. Attention to overall improvements in the care provided both before and after discharge is therefore warranted.

The strengths of this study include the availability of a national population-based schizophrenia registry, prospective collection of data on suicide risk

Table 1

Patient- and treatment-related characteristics according to use of systematic suicide risk assessment for discharged psychiatric patients

Characteristic	Suicide risk assessment		No suicide risk assessment		Missing data on risk assessment		Association with suicide risk assessment				
	(N=5,631)		(N=1,476)		(N=2,638)		Crude		Adjusted ^a		p
	N	%	N	%	N	%	OR	95% CI	OR	95% CI	
Sex							.78	.69–.88	.78	.68–.90	.001
Females (reference)	2,354	42	528	36	1,030	39					
Males	3,277	58	948	64	1,608	61					
Age											
<30 years (reference)	1,427	25	308	21	594	23					
30–39 years	1,464	26	382	26	678	26	.84	.72–.99	.86	.73–1.01	.07
40–49 years	1,379	24	351	24	646	24	.83	.70–.98	.86	.72–1.03	.11
50–59 years	873	16	248	17	433	16	.74	.62–.89	.76	.63–.93	.007
≥60 years	488	9	187	12	287	11	.59	.48–.72	.60	.49–.75	<.001
Abuse											
Alcohol							.84	.73–.96	.96	.81–1.12	.58
No (reference)	3,819	68	939	64	1,628	62					
Yes	1,470	26	429	29	700	26					
Unknown	342	6	108	7	310	12					
Cannabis							.85	.74–.97	.96	.79–1.17	.69
No (reference)	4,020	71	995	67	1,681	64					
Yes	1,173	21	341	23	610	23					
Unknown	438	8	140	10	347	13					
Benzodiazepines							.74	.60–.92	1.08	.77–1.51	.66
No (reference)	4,739	84	1,174	80	1,981	75					
Yes	334	6	108	7	186	7					
Unknown	558	10	194	13	471	18					
Opioids							.63	.50–.80	.75	.52–1.08	.12
No (reference)	4,818	86	1,186	81	1,922	73					
Yes	248	4	94	6	137	5					
Unknown	565	10	196	13	579	22					
CNS-stimulating drugs ^b							.79	.66–.95	1.15	.85–1.56	.36
No (reference)	4,612	82	1,134	77	1,804	68					
Yes	503	9	148	10	236	9					
Unknown	516	9	194	13	598	23					
Other street drugs							.62	.49–.78	.67	.48–.98	.04
No (reference)	4,705	84	1,142	77	1,859	71					
Yes	190	3	75	5	144	5					
Unknown	736	13	259	18	635	24					
GAF score ^c											
<30 (reference)	370	7	167	11	261	10					
30–39	1,741	31	407	28	672	26	1.76	1.44–2.15	1.64	1.34–2.01	<.001
40–49	1,470	26	354	24	594	22	1.78	1.43–2.22	1.57	1.26–1.97	<.001
≥50	1,223	22	296	20	470	18	1.80	1.45–2.23	1.60	1.29–1.99	<.001
Unknown	827	14	252	17	641	24					
Antipsychotic medical treatment							1.17	.87–1.56	1.02	.76–1.38	.88
No (reference)	192	3	62	4	110	4					
Yes	4,637	83	1,313	89	2,342	89					
Unknown	802	14	101	7	186	7					
Contact with relatives							.93	.82–1.05	.73	.64–.84	<.001
No (reference)	1,941	35	491	33	882	33					
Yes	3,337	59	917	62	1,467	56					
Unknown	353	6	68	5	289	11					
Psychoeducation during hospitalization							1.86	1.64–2.10	1.89	1.65–2.16	<.001
No (reference)	1,642	29	643	44	909	35					
Yes	3,715	66	785	53	1,455	55					
Unknown	274	5	48	3	274	10					

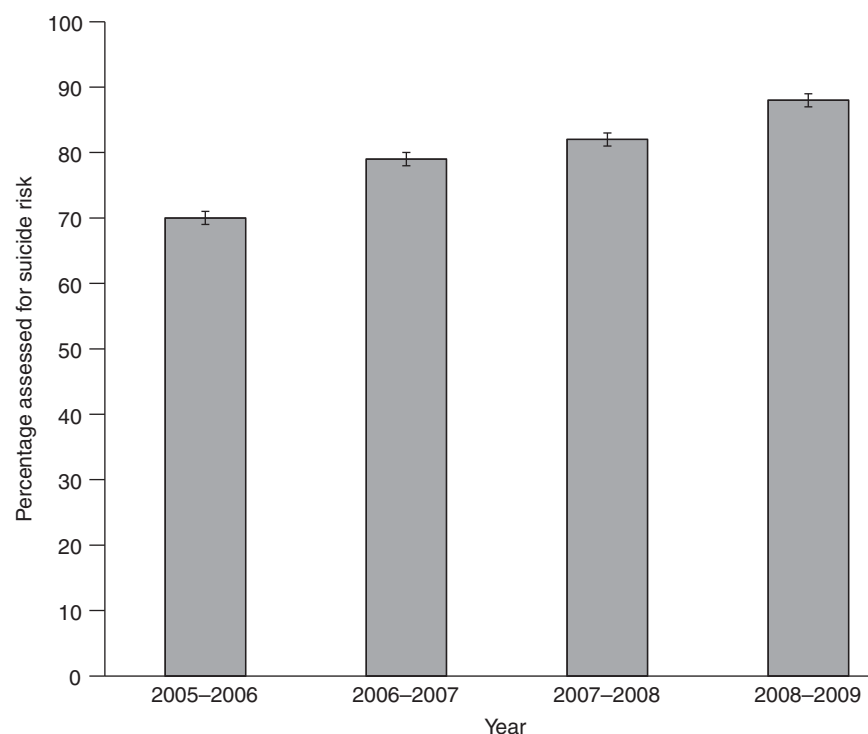
^a Adjusted for sex, age, abuse, Global Assessment of Functioning (GAF) score, antipsychotic medical treatment, contact with relatives, and psychoeducation during hospitalization

^b CNS, central nervous system

^c Possible scores range from 0 to 100, with higher scores indicating better functioning.

Figure 1

Danish patients assessed for suicide risk at psychiatric ward discharge, 2005–2009^a



^a Years began on April 1 and ended on March 31. Error bars indicate 95% confidence intervals.

assessment from all Danish psychiatric wards, and the availability of detailed data on a wide range of covariates. Moreover, the unique civil registry number system enabled complete follow-up by linkage to other registries. Study limitations included missing information on suicide risk assessment and to a varying degree the patient- and treatment-related covariates. In addition, the dichotomous suicide risk assessment (yes-no) registration in the DNIP was a crude variable that may not have captured whether the assessment was carefully conducted in all situations. Finally, using a hospital discharge registry to identify suicide attempters enabled us to capture only events that led to hospitalization and the diagnoses of suicide attempters by the health care professionals treating them.

Conclusions

The use of systematic suicide risk assessment before discharge from Danish psychiatric wards has increased within recent years, since the introduction of a nationwide quality-of-care initiative. Additional efforts appear warranted in order to ensure that all patients receive systematic suicide

Table 2

Association between treatment characteristics and suicide risk assessment among patients with a new schizophrenia diagnosis

Treatment characteristic	Suicide risk assessment		No suicide risk assessment		Missing data on risk assessment		Association with suicide risk assessment				
	(N=1,162)		(N=245)		(N=414)		Crude		Adjusted ^a		p
	N	%	N	%	N	%	OR	95% CI	OR	95% CI	
Psychopathology assessment performed by medical specialist							1.43	.94–2.19	1.47	.97–2.22	.07
No (reference)	106	9	31	13	32	8					
Yes	1,000	86	203	83	329	79					
Unknown	56	5	11	4	53	13					
Psychopathology assessment performed by interview test							1.68	1.20–2.36	1.57	1.10–2.26	.02
No (reference)	438	38	135	55	185	45					
Yes	356	30	62	25	88	21					
Unknown	368	32	48	20	141	34					
Cognitive test							1.72	1.28–2.31	1.56	1.14–2.20	.01
No (reference)	664	57	173	71	236	57					
Yes	406	35	58	24	115	28					
Unknown	92	8	14	6	63	15					
Contact with social worker							1.03	.76–1.41	.83	.61–1.14	.25
No (reference)	158	14	40	16	50	12					
Yes	913	78	192	79	302	73					
Unknown	91	8	13	5	62	15					

^a Adjusted for psychopathology assessments performed by a medical specialist or by interview test and for cognitive test and contact with social worker

risk assessment before being discharged and that appropriate measures are taken to lower the risk of suicidal behavior.

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