Risk Factors for Completed Suicide in Schizophrenia

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Objective: Schizophrenic patients in Taiwan have lower comorbidity of substance use disorders than do those in Western countries, and most of them live with their families. This study investigated the risk factors for completed suicide in this population with inherently lower rates of the confounding variables of substance abuse and social isolation.

Method: 4237 acute inpatients with DSM-III, DSM-III-R, or DSM-IV schizophrenia admitted from January 1, 1985, to December 31, 2000, were followed through 2001 by record linkage to the Death Certification System. Seventy-eight subjects who died from suicide during this period were matched with living controls randomly for age (± 5 years), sex, and the same year of index admission. Demographic and clinical variables were collected from medical records and formally confirmed at every admission and outpatient follow-up.

Results: Among 78 case-control pairs, the lifetime prevalence of substance use disorders was 7.1%, and 93.6% of the subjects lived with their families. Approximately half of the completed suicides occurred within 4 years after the first admission. Conditional logistic regression analysis revealed a strong association with the following 3 variables: depressive syndrome in residual phase (adjusted odds ratio [OR] = 23.07, $p < .005$), higher suicide intensity (adjusted OR = 2.78, $p < .05$), and later age at onset (increase per year, adjusted OR = 1.07, $p < .05$). Fasting cholesterol level and clozapine use had no association with completed suicide.

Conclusions: The peak period for completed suicide was early years after the first admission. The target population for additional measures to prevent suicide should include patients with depressive syndrome in residual phase, higher suicide intensity, and later onset of illness.

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Suicide is the main cause of premature death among individuals with schizophrenia. The lifetime risk for committing suicide is generally quoted as 10%, although this estimate for schizophrenic patients could be too high.[1] The risk factors for completed suicide include young adult age, being male, alcoholism, mean illness duration less than 10 years, social isolation, comorbid depressive symptoms, history of previous suicide attempts, and suicide method.[2–7] However, most reports of risk factors for suicide in schizophrenic patients have been from Western countries, and data from Taiwan are limited.[2] The Epidemiologic Catchment Area (ECA) Study revealed a 47% lifetime prevalence of psychoactive substance disorders among the U.S. total community and institutional population of schizophrenic patients,[8] which was higher than that of Chinese psychotic inpatients in Hong Kong (19%).[9] A study from Finland[10] revealed that 37% of the schizophrenic patients completing suicide lived alone, while a population study from the United States found that 32% lived alone.[3] By contrast, only 9.5% of schizophrenic patients in Taiwan lived alone.[2] That suicide outcome is complicated by unfavorable family support and a higher prevalence of alcohol/drug use disorders makes it difficult to identify risk factors and demonstrate the nature of suicide in schizophrenics.

Determination of the high-risk groups for completed suicide is essential to the development of preventive strategies. The main difficulty is that, unlike attempted suicide, completed suicide is relatively rare during a short-term period.[11] Therefore, case-control study with a large sample size under a long follow-up period is needed. Moreover, in many previous case-control studies, the number of subjects was relatively small, inevitably limiting their statistical power when multiple factors were considered in the analysis. Several studies[2–7] have investigated the characteristics of schizophrenia patients with completed suicide among groups of 15 or more patients, and one[2] of these studies was from Taiwan and performed in early 1990s.

We designed this sex- and age-controlled study with a large sample of suicide completers with schizophrenia. The present study aims to examine, in an Eastern country, all the important clinical factors preceding suicide previously reported in Western societies, and to explore the period of higher suicide risk during the illness.

METHOD

Subjects

All the subjects included in this study were treated at Taipei City Psychiatric Center (TCPC), a psychiatric teaching hospital that provides comprehensive psychiatric services and is assigned as a center for the northern Taiwan catchment region. TCPC provided 500 beds for acute patients and 300 beds for chronic patients in 2000. After 1992, second-generation antipsychotics (e.g., clozapine, risperidone) were available and prescribed while clinically indicated. Between January 1, 1985, and December 31, 2000, a total of 4237 patients with schizophrenia were admitted to TCPC.

Each citizen in Taiwan has a unique national identity (ID) number. We used this ID number to identify deceased subjects in our patient sample. The roster of inpatients with schizophrenia was electronically matched against computerized files from the Department of Health Death Certification System (DCS) in Taiwan issued for the period from January 1, 1985, through December 31, 2001. Based on this linkage, we determined that the outcome for these patients included suicidal death in 79, other causes of death in 315, and 3843 survivors. The method of completing suicide for each subject was also identified from the DCS computerized files.

If the patient had several hospitalizations during the study period, the earliest admission was considered to be the index admission. About 90% of index admissions were considered as being for treatment of the first episode of illness. From the survivors (N = 3843), a living control matched for each suicide completer was randomly selected on the basis of age (± 5 years), sex, and the same year of index admission. After exclusion of 1 suicide completer for whom a living control could not be found, a total of 78 suicide-control pairs were included in the study.

Data Collection

The methodology of this suicide study has been described in detail elsewhere[12] and will be briefly summarized here. Since 1980, a case notes form has been used for patients visiting TCPC for the first time, with another form being used for those who are admitted. Each form contains over 95 items structured to obtain specific and comprehensive information from patients regarding demographic characteristics, past and present illness, mental state examination, physical condition, alcohol/drug use problems, and family history. Psychiatric diagnoses were made based on DSM-III,[13] DSM-III-R,[14] or DSM-IV[15] criteria, which were the diagnostic systems used in Taiwan after 1980. Psychiatric residents and attending physicians made diagnoses through semistructured interviews when the patients were discharged, and the diagnoses were periodically reviewed by attending physicians in the outpatient department during follow-up. A semistructured parallel interview for confirming information with family members or others who knew the patient well was routinely conducted at the time of admission. The mental illness and suicide histories of first-degree relatives were routinely collected through interview with the patient or with other family members or caretakers during the hospitalization. Thus, the sources of data about the patient's hospitalization included standard interviews, serial clinical assessments, and direct observation by psychiatrists, nursing staffs, and social workers. A fasting blood specimen was routinely drawn after admission on the first morning for the metabolic and serologic analysis and routine blood examinations.

Information for each subject including psychiatric diagnoses was carefully and independently reviewed by one of our research group (C.-J.K., S.-Y.T., C.-H.L., and Y.-P.W.). All of these investigators had received a training program for psychiatric residents provided at TCPC and were board-certified psychiatrists. The chart reviewers were blinded to the subjects' case or control status. Strict DSM-IV diagnostic criteria were reapplied to each subject to confirm the diagnosis of schizophrenia throughout the course of the mental illness. For the purpose of data reliability, only data provided in the medical and nursing notes were used in the analysis. The onset of schizophrenia was defined as the first occurrence of prominent psychotic symptoms causing severe impairment in psychosocial functioning or symptoms necessitating hospitalization.

To facilitate chart review, we developed a specified chart abstraction form consisting of 112 items that typically required about an hour to complete. Substantive areas of the form included demographic characteristics, social support network, and laboratory data relating to the index admission and other clinical features of the patient's history. The patient's history was obtained from the case notes, including the onset of illness, prior suicide attempt, comorbid psychiatric disorders, and coexisting significant physical illness. The comorbid psychiatric disorders included depressive syndrome in the residual phase, major depressive episode in the residual phase, alcoholism, and substance use disorders.

The diagnosis of depressive syndrome in residual phase required at least 1 of the following 2 conditions after the index admission: (1) any antidepressant (e.g., selective serotonin reuptake inhibitors, tricyclic antidepressants) prescribed in residual phase and (2) depressed mood plus at least 1 other symptom of DSM-IV major depressive disorder appearing in residual phase and recorded on the patient's medical chart. *Suicide attempt* was defined as any serious potentially life-threatening act of self-harm requiring treatment. Behaviors that were clinically judged by trained researchers to be either not life-threatening or to be trivial injuries, such as those that may have been performed to draw the attention of others, were not classified

Table 1. Sociodemographic and Clinical Characteristics of Suicide Completers and Living Controls With Schizophrenia at Index Admission

Characteristic	Suicide Completers (N = 78)	Living Controls (N = 78)
Male, N (%)	38 (48.7)	38 (48.7)
Age, mean (SD), y	32.5 (9.9)	32.9 (10.4)
Education, mean (SD), y	11.1 (3.1)	10.7 (3.2)
Marital status, N (%)		
Never married	48 (61.5)	54 (69.2)
Separated or divorced	11 (14.1)	8 (10.3)
Married or cohabiting	19 (24.4)	16 (20.5)
Living with family members, N (%)	73 (93.6)	73 (93.6)
Socioeconomic status, N (%)[a]		
Class I	1 (1.3)	0 (0.0)
Class II	3 (3.9)	0 (0.0)
Class III	1 (1.3)	2 (2.6)
Class IV	25 (32.1)	26 (33.3)
Class V	48 (61.5)	50 (64.1)
Education ≥ 12 y, N (%)	38 (48.7)	38 (48.7)
Unemployed, N (%)	47 (60.3)	47 (60.3)

[a]Determined using the Hollingshead scale.[17]

Table 2. Lifetime Psychiatric History of Suicide Completers and Living Controls With Schizophrenia

Characteristic	Suicide Completers (N = 78)	Living Controls (N = 78)
Categorical, N (%)		
Family history within first-degree relative		
Schizophrenia	8 (10.3)	11 (14.1)
Substance use disorder	2 (2.6)	2 (2.6)
Suicide death	1 (1.3)	1 (1.3)
Comorbidity in lifetime	38 (48.7)	7 (9.0)***
Depressive syndrome in residual phase	27 (34.6)	4 (5.1)***
Major depressive episode in residual phase	2 (2.6)	0 (0.0)
Alcoholism	5 (6.4)	1 (1.3)
Other substance use disorders	4 (5.1)	1 (1.3)
Other	2 (2.6)	1 (1.3)
Suicide attempt in lifetime	43 (55.1)	25 (32.1)**
Violent suicide attempt in lifetime	25 (32.1)	12 (15.4)*
More than 1 suicide attempt per 7 y in lifetime	28 (35.9)	9 (11.5)***
Clozapine treatment in lifetime	10 (12.8)	17 (21.8)
Risperidone treatment in lifetime	8 (10.3)	7 (9.0)
Numerical, mean (SD)		
Age at onset, y	25.9 (7.4)	23.6 (8.2)†
Age at first TCPC psychiatric contact, y	30.6 (9.3)	29.2 (10.9)
Age at last TCPC visit, y	36.4 (10.1)	39.3 (9.2)
Suicide attempts/year (duration)	0.28 (0.59)	0.12 (0.76)
No. of acute hospitalizations in lifetime	3.15 (2.66)	3.55 (2.71)

*p < .05, **p < .01, ***p < .001, †p = .063.
Abbreviation: TCPC = Taipei City Psychiatric Center.

as suicide attempts. The total number of prior suicide attempts and the suicide methods were recorded. The assessment of prior suicidal history included a continuous rate measure of suicide intensity (attempts per year at risk). All of the data collected were double-checked to rule out potential individual errors.

A reliability study was performed in which the chart reviewers collected data on the related variables independently from 12 subjects (including 6 suicides and 6 controls). The results revealed satisfactory interrater reliability. For example, the kappa values of related variables were more than 0.7, including family history of schizophrenia, depressive syndrome in residual phase, and comorbid substance use disorders.

Statistical Analysis

Comparisons of explanatory categorical variables for patients with completed suicide and controls were made using the χ^2 test with Yates correction or Fisher exact test. Two-tailed Student t test was used for continuous variables. The analysis reported herein involves a conditional logistic regression fitted through a stepwise variable selection procedure by using Egret software for Windows.[16] A value of $p < .05$ was considered significant. The potential independent variables with at least a moderate association with suicide ($p < .15$) were selected for entry into the multivariate logistic regression model.

RESULTS

The sociodemographic data related to the index admission are listed in Table 1. Suicide completers and controls had similar distributions of sex and age. Suicide completers and controls were predominantly from lower socioeconomic classes (Hollingshead class IV or V)[17] and lived with family members (93.6%). During the study period, the mean (SD) duration of the index admission for the overall group of subjects was 42.4 (23.5) days. Among the 78 suicide completers, the mean (SD) age at which completed suicide occurred was 31.5 (8.0) years for women (N = 40) and did not significantly differ from the mean age of 33.6 (11.5) years for men (N = 38). Thirty patients (38.5%) committed suicide at the age of 35 years or younger. The mean (SD) interval from onset of schizophrenia to completing suicide was 11.3 (8.1) years and ranged from 1.0 to 38.3 years. Forty-nine suicide completers (62.8%) had at least a 7-year history of schizophrenia illness prior to suicide. The mean (SD) interval from the index admission to completing suicide was 4.7 (4.2) years. The suicide completers used methods including jumping from a high place (N = 25), drugs/poison (N = 18), hanging (N = 16), drowning (N = 10), cutting (N = 6), and others (N = 3), but none used firearms.

Characteristics related to lifetime psychiatric history of suicide completers and controls are summarized in Table 2. There was no significant difference between suicide completers and controls regarding a positive first-degree family history of suicide. A higher proportion of suicide completers had a history of comorbid mental disorders

than controls (48.7% vs. 9.0%; $\chi^2 = 28.1$, $p < .001$), especially depressive syndrome in residual phase (34.6% vs. 5.1%; $\chi^2 = 16.9$, $p < .001$). Both groups had a relatively low proportion of major depressive episode in the residual phase (< 1.3%). The rates of comorbid alcoholism and/or other substance use disorders also were low. Lifetime history of clozapine and risperidone therapy was found in 17.3% and 9.6% of total subjects, respectively, and was not significantly different between the 2 groups.

Suicide completers had a later age at onset of schizophrenia than controls that was of borderline significance ($p = .063$). Significantly more suicide completers (N = 43, 55.1%) had made previous suicide attempt(s) in their lifetime compared with controls (N = 25, 32.1%) ($\chi^2 = 7.53$, $p < .01$). Suicide completers had higher numbers of lifetime suicide attempts than living controls with mean (SD) numbers of 2.0 (3.0) and 0.6 (1.5), respectively ($p < .001$). Significantly more suicide completers had used violent suicide methods during their lifetime compared with living controls (32.1% vs. 15.4%, $p < .05$). Less than half (44.9%) of suicide completers had no previous suicide attempt and died as a result of their first suicidal acts.

To examine the suicide intensity based on chart review, the time interval of illness was defined as years from the onset of schizophrenia to last contact at TCPC, while suicidal intensity (annual rate of suicide attempts) was defined as the number of suicide attempts per year of illness. When the cutoff for suicidal intensity was 1/7 or greater (i.e., prior to completing suicide, at least 1 suicide attempt within 7 years of illness), this variable revealed a more significant association with suicide (35.9% vs. 11.5%, $p < .001$) (Table 2).

At the time of index admission, 17 (10.9%) of total subjects had a previous suicide attempt, and there was no significant difference in the number of previous suicide attempts between the 2 groups. The mean (SD) interval from the index admission to death was 4.7 (4.2) years (range, 0.07–20.9 years). Sixteen suicides (20.5%) occurred within the first year after the index admission, and 8 suicides (10.3%) in the second year. About half (53.8%) of those who committed suicide did so within 4 years after the index admission. Although 10% of total subjects had a major depressive episode during the index hospitalization, suicide completers had a significantly higher rate of depressive episode than controls (12.8% vs. 3.8%, Fisher's exact test, $p < .039$).

Among the laboratory variables, compared with living controls, suicide completers had a lower mean fasting blood sugar (91.5 vs. 98.9 mg/dL, $p < .05$) and a higher mean uric acid (6.9 vs. 5.7 mg/dL, $p < .05$). The level of γ-glutamyltransferase (GGT) in suicide completers was higher than in controls (43.4 vs. 29.0 U/L), but this difference was not significant. The values of other laboratory variables were similar between the 2 groups.

Table 3. Conditional Logistic Regression of Risk Factors for Completed Suicide in Patients With Schizophrenia (N = 78)

Variable	Adjusted OR	95% CI for OR	p Value
Suicide attempts/y (> 1 suicide attempt within 7 y)	2.8	1.0 to 7.6	p < .05
Depressive syndrome in residual phase	23.1	3.0 to 177.7	p < .01
Later age at onset, y (increase per y of age)	1.1	1.0 to 1.1	p < .05

Abbreviations: CI = confidence interval, OR = odds ratio.

Multivariate Analysis

Conditional logistic regression analysis was used to assess the simultaneous impact of several potential risk factors for suicide based on the preliminary univariate associations shown in Table 2 and the associations of various laboratory variables at the time of index admission. Further statistical analysis was carried out to yield an explanatory model for predicting suicide outcome that was highly significant overall. Finally, there were 3 factors that had a strong association with suicide by the likelihood ratio test ($\chi^2 = 36.9$, df = 3, $p < .001$), which in rank order of their overall significance were depressive syndrome in residual phase, suicide intensity (> 1 suicide attempt within 7 years), and later age at onset. The results of this regression analysis are presented in Table 3.

DISCUSSION

This is the first reported study of risk factors for completed suicide from Chinese schizophrenic inpatients in the last decade. The lifetime prevalence of this study sample was associated with low rates of substance use disorders (7.1%) and living alone (6.4%). These findings are different from previous studies from Western countries; for instance, there was a higher lifetime prevalence of substance use disorders (47%) among patients in the ECA study,[8] and the rates of living alone among schizophrenics lie around 37% to 60%.[3,10] While living alone and substance use disorders are traditionally considered risk factors for suicide among patients with schizophrenia,[4] these factors may not be associated with similar risk in Chinese countries. Regarding the methodological consideration, by chart reviewing instead of face-to-face interviewing, our family history method probably detects illness among relatives with less sensitivity. However, the positive rate of schizophrenia-spectrum disorders in first-degree relatives of our living controls (Table 2) lies around 8.8% estimated by the literature without underestimation.[18] Therefore, the validity of this study appears satisfactory, and it appears that our data would be reliable. One limitation of this study was that other causes of death (usually "accidental") are often put on the death certificate for official use to avoid any potential stigma associ-

ated with suicide. Therefore, the incidence of suicide is highly likely to have been underestimated in the present study. Additionally, matching for age and gender can lead to loss of the ability to detect such explanatory variables.

The definition of depressive syndrome includes either use of any antidepressants during the residual phase or depressive mood plus another DSM-IV symptom of major depression. The empirical data from this study did not allow us to draw statistical inferences regarding suicidality and antidepressant use, and we therefore could only emphasize the characteristics of depressive syndrome that clinicians encountered and their responses. In this study, physician responses to encountering such patients included either recording the depression-related symptoms on the chart or prescribing antidepressants for treatment.

A previous study from Taiwan[2] found that the mean (SD) age at completed suicide was 26.9 (7.2) years, and only 4 subjects (9.5%) were older than 40 years. By contrast, the mean age in this study was higher (37.2 years), and ranged from 20 to 66 years. In the present study, there were 25 subjects (32.1%) older than 40 years. However, this study had better validity in this regard than the former study. The former study[2] used an informant strategy to search for suicide completers, while a case-linkage analysis was used in this study. Case-linkage study allows for more complete follow-up of the suicide outcome, except for the very few migration cases. A study from Canada[4] reported that male schizophrenics committed suicide after a mean duration of illness of 4.8 years, which was significantly shorter than for female schizophrenics (9.8 years). In this study, no significant difference by gender was found for the mean (SD) duration from onset of illness to committing suicide, which was longer with 10.7 (8.1) years. However, the duration from onset of illness to suicide in this study was similar to a study from Scotland, which found a duration of illness before suicide of more than 10 years in both genders.[19] Previous studies revealed those who were discharged from psychiatric hospitals recently were a high-risk group for suicide.[4,9] In this study, the mean interval from the index admission to completed suicide was 4.7 years. About half of completed suicides (53.8%) occurred within 4 years after the index admission, which should be considered as a high-risk period meriting increased clinical attention.

In this study, 3 major findings manifest the strong association of completed suicide with depressive syndrome in residual phase, greater suicide intensity, and later onset of schizophrenia. The strong relationship between depression and suicidality in schizophrenic patients has been confirmed in many works[2,3,6,10]; however, inconsistency exists regarding the definition of depression. To avoid recall bias in this study, concrete information was used for defining depressive syndrome in residual phase (listed in Method section), i.e., in residual phase, either prescription of antidepressant or depressed mood plus at least 1 other symptom of DSM-IV major depressive disorder. In this study, major depressive episode in residual phase was rare, indicating a low sensitivity for predicting completed suicide. However, a significantly higher proportion of completers had depressive syndrome in residual phase than controls, and multivariate analysis indicated a strong association between this finding and completed suicide.

As for the proximity of the current diagnostic criteria, depressive syndrome in residual phase is nearer to the context of postschizophrenic depression in the *International Classification of Diseases*, 10th Revision, (ICD-10)[20] than to postpsychotic depressive disorder of schizophrenia in DSM-IV[15] regarding the severity. The latter is characterized by a major depressive episode that occurs during the residual phase of schizophrenia.[15(p711)] The former is defined as depressive symptoms that are prominent and distressing, fulfilling at least the criteria for a depressive episode (F32), and have been present for at least 2 weeks. However, a depressive episode (F32) is not necessary to fulfill the severity of major depressive disorder by the DSM-IV. These findings suggest that the ICD-10 criteria for postschizophrenic depression may be more applicable to suicide prevention. The results of this study also emphasize the importance of depressive syndrome in suicide prevention. Previous treatment studies[21–23] supported the use of adjunctive antidepressant treatment for schizophrenic patients who develop major depression after remission of acute psychosis, so indications for treatment of postschizophrenic depression were controversial. However, given the findings from this study, the prescription of antidepressants seems to be reasonable for patients with postschizophrenic depression due to their higher suicide risk. Further study to demonstrate the efficacy of such treatment at preventing suicide is also needed.

The mean duration from index admission to last follow-up for suicide completers was significantly shorter than that for living controls (4.73 vs. 9.47 years, $p < .001$). Suicide completers had fewer years of some post-admission information available, such as the identified risk factor of depressive syndrome in the residual phase. However, our finding that depressive syndrome occurred more frequently during a shorter duration among suicide completers, and was cumulatively less common among survivors even over their longer duration of admission, seems to add support to the relationship between the occurrence of this condition and suicide completion despite the necessarily shorter period of data collection for cases. Other identified risk factors were not associated with the length of the data collection duration, such as onset of illness and suicide intensity.

Many previous studies[2,4,6,10] have indicated that previous suicide attempt is a significant predictor of suicidal death among schizophrenic patients. In this study, although suicide completers had higher proportions of previous suicide attempt, violent suicide attempt, and suicide

intensity than controls (Table 2), only suicide intensity was included in the multivariate analysis as a predictor. To our knowledge, rare studies have quantified the intensity of suicide attempt in schizophrenic patients. Our data suggests those who had more than one suicide attempt per 7-year period since the onset of schizophrenia are the high-risk groups for completed suicide.

Some previous studies reported that patients who had an earlier onset of schizophrenia were a high-risk group for committing suicide.[7,24] A previous study from Taiwan[2] found no significant difference in age at onset between patients committing suicide and not committing suicide. In the present study, although no significant association was found between age at onset and suicidality in the univariate analysis ($p = .063$), multivariate analysis showed that the odds ratio for suicide risk was 1.13 for each increment of 1 year. Therefore, our results suggest that later onset of illness might also be correlated with completed suicide. This finding suggests the possibility either that mood disorders have a confounding effect or that suicide completers may be less likely to include patients with chronic early onset forms of schizophrenia, which might be associated with more negative symptoms and a lower expected rate of suicidality. However, the strict application of DSM-IV diagnostic criteria in each patient to confirm the diagnosis of schizophrenia in this study should have reduced the potential for the former effect.

Several variables, including clozapine use[25–28] and low cholesterol,[29,30] have been found to be related to suicide risk. Most previous studies found that clozapine treatment was associated with a reduction in completed suicides,[25–27] except for one study from the United States.[28] By contrast, in this study the rate of the lifetime use of clozapine in controls was higher than that in suicide completers (21.8% vs. 12.8%, $p = .19$). However, as this difference was not significant, we could not confirm that the use of clozapine was associated with a reduction in suicide.

In this study, the GGT level was higher in suicide completers than controls (43.4 vs. 29.0 U/L, $p = .072$), and this might have been partially attributable to the higher rate of alcoholism in suicide completers than in controls. However, the GGT levels of most patients in both groups were lower than the upper limit of normal (50 U/L), while the seropositive rate for hepatitis B surface antigen, indicating the presence of viral infection that is endemic in the Taiwanese population and is associated with elevated GGT level, was greater in suicide completers than in controls (22.7% vs. 10.4%, $p = .057$). This suggests that elevated GGT level was more likely to have been influenced by hepatitis B infection than alcoholism. The rate of alcoholism was not significantly different between suicide completers and controls (6.4% vs. 1.3%, $p = .21$). This study found no relation between serum cholesterol level and completed suicide. A study from the United Kingdom[29] and another from Korea[30] investigated patients admitted to an emergency room following attempted suicide and found lower cholesterol levels in suicide attempters with mood disorders or personality disorders, but not schizophrenia. Thus, the association between cholesterol and suicidality remains complex and may depend on the population studied. Its usefulness as a marker for preventing committing suicide of schizophrenics remains limited.

In summary, approximately half of suicide completions occurred within 4 years after index admission. Patients who had later onset of schizophrenia were more likely to commit suicide in the future. In addition, patients who had depressive syndrome in residual phase or higher suicide intensity comprised a target population for suicide prevention.

Drug names: clozapine (Clozaril, FazaClo, and others), risperidone (Risperdal).

Disclosure of off-label usage: The authors have determined that, to the best of their knowledge, no investigational information about pharmaceutical agents that is outside U.S. Food and Drug Administration–approved labeling has been presented in this article.

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