Symptoms, Subtype, and Suicidality in Patients With Schizophrenia Spectrum Disorders

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Objective: *Suicide is the single largest cause of premature death among individuals with schizophrenia. This report examines the relationship between positive or negative symptoms, illness subtype, and suicidal behavior among patients with schizophrenia and schizophrenia spectrum disorders in a long-term follow-up cohort.* *Method:* *Based on index admission records, patients from the Chestnut Lodge Follow-Up Study with schizophrenia (N=187), schizoaffective disorder (N=87), schizophreniform disorder (N=15), and schizotypal personality disorder (N=33) were retrospectively assessed with the Positive and Negative Syndrome Scale, classical subtype criteria, and criteria for the deficit syndrome. Completed suicide, suicide attempts, and suicidal ideation during the follow-up period (average=19 years) were ascertained by means of interviews with patients and/or surviving relatives.* *Results:* *Over the follow-up period, 40% of the patients reported suicidal ideation, 23% reported suicide attempts, and 6.4% died from suicide. Patients dead from suicide had significantly* lower *negative symptom severity at index admission than patients without suicidal behaviors. Two positive symptoms (suspiciousness and delusions), however, were* more *severe among successful suicides. The paranoid schizophrenia subtype was associated with an elevated risk (12%) and the deficit subtype was associated with a reduced risk (1.5%) of suicide.* *Conclusions:* *The impact of positive and negative symptoms on suicide risk has not been reported. These findings suggest that prominent negative symptoms, such as diminished drive, blunted affect, and social and emotional withdrawal, counter the emergence of suicidality in patients with schizophrenia spectrum disorders and that the deficit syndrome defines a group at relatively low risk for suicide. Prominent suspiciousness in the absence of negative symptoms defines a relatively high-risk group.*

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Schizophrenia is a disease that reduces the life expectancy of those afflicted by approximately 10 years, and suicide accounts for the majority of premature deaths among patients with schizophrenia (1–3). In a review of studies conducted through the mid-1970s, Miles (4) estimated that 10% of individuals with schizophrenia die by suicide. More recent studies with follow-up periods ranging from 1 to 40 years estimated long-term suicide risk to be between 10% and 13%, rates approaching those observed in affective disorders (5–7). Substantial morbidity associated with suicidal behaviors is also characteristic of schizophrenia. At some time during the course of illness, as many as half of all patients with schizophrenia have been reported to experience suicidal ideation and/or to have made suicide attempts (8–12), often of a particularly serious and violent nature (13). Reducing morbidity and mortality from suicide clearly remains a major clinical challenge in the care of patients with schizophrenia.

The recognition of risk factors for suicide is one element of prediction and prevention. In a study of the natural history of illness and long-term course of a group of patients with schizophrenia (14, 15), we noted a greater suicide risk among patients diagnosed with paranoid schizophrenia and an apparently lower suicide risk among patients with negative or deficit subtypes of schizophrenia. To further explore a possible association between suicidal behavior and positive and negative symptoms, we obtained symptom and subtype ratings for a larger group of patients in the follow-up study cohort with diagnoses of not only schizophrenia

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but also schizoaffective disorder, schizophreniform disorder, and schizotypal personality disorder. This report examines the relationship between specific positive and negative symptoms and illness subtype and subsequent suicide, suicide attempts, and suicidal ideation in this group of patients with schizophrenia and schizophrenia spectrum disorders.

METHOD

A detailed methodologic outline of the Chestnut Lodge Follow-Up Study has been described elsewhere (16, 17). The original follow-up study included all patients discharged from Chestnut Lodge Hospital in Rockville, Md., between 1950 and 1975. These patients were retrospectively rediagnosed according to modern criteria, and baseline index admission demographic and prognostic information was coded from chart summaries. Outcome data were collected blind to baseline data by means of interviews with the subjects and/or significant others an average of 19 years (range=6–32) after index admission. Written informed consent was obtained from interviewees following explanation of the interview procedures.

Schizophrenia Subtype Study

To explore the validity of alternate methods of subtyping schizophrenia, extensive original medical records for all patients in the follow-up cohort who on review met DSM-III or Feighner (18) criteria for schizophrenia (N=187) were reviewed by one of us (W.S.F.). Blind to baseline and outcome data collected in the original study, the reviewer coded additional illness natural history variables and diagnosed and rated patients retrospectively using a variety of positive and negative schizophrenic symptom scales and schizophrenia subtype criteria. Symptom and subtype ratings were based on all recorded information referencing the patient's condition during the 6 months before and first 3 months of the index hospitalization. Nearly all symptom ratings were based on observations of patients who had either never been exposed to a neuroleptic or were not currently taking neuroleptic medication. A detailed methodologic outline of the schizophrenia subtype project, including the interrater reliability of all measures, is available elsewhere (14, 15).

For the current study, an additional team of two raters (Ph.D. candidates trained by one of us [W.S.F.]) rated positive and negative symptoms, subtype, and natural history of illness variables for patients in the follow-up cohort diagnosed as having DSM-III schizoaffective disorder (N=87), schizophreniform disorder (N=15), and schizotypal personality disorder (N=33). The same measures used to rate and subtype the original patients with schizophrenia were applied to patients with these schizophrenia spectrum disorders. Patients with schizoaffective disorder were defined as meeting DSM-III criteria for both schizophrenia and affective disorder (16).

Symptom and Subtype Ratings

The Positive and Negative Syndrome Scale was used to rate symptom severity on a 7-point severity scale at the time of index admission. Research criteria for the classical schizophrenia subtypes (paranoid, hebephrenic, and undifferentiated) designed to approximate DSM-III-R criteria and used in the schizophrenia subtype study (14) were applied to patients with schizophreniform disorder and schizoaffective disorder. The early criteria for the deficit syndrome of Carpenter et al. (19), which differ slightly from the more recent criteria of Carpenter et al. (20), were also used to subtype schizophrenia spectrum patients not previously categorized. Following review of 10 cases to establish consistency with ratings by one of us (W.S.F.), 20 cases were independently assessed by each rater to evaluate interrater reliability. Reliability of symptom and subtype ratings was comparable to that obtained in the original subtype project (14, 15). Interrater reliability was 0.88 (intraclass correlation) for Positive and Negative Syndrome Scale negative symptoms, 0.89 (intraclass correlation) for Positive and Negative Syndrome Scale positive symptoms, 0.79 (kappa) for paranoid versus nonparanoid subtypes, and 0.64 (95% agreement) for deficit versus nondeficit subtypes.

Suicide Assessment

Outcome data collected during follow-up interviews included the patient's self-report of suicidal ideation and/or suicide attempts since hospital discharge. Data on completed suicide were obtained by means of interviews with surviving relatives. Because inpatient suicide precluded blind rating of records, these cases (N=6) were excluded from analyses. Follow-up information was obtained from patients and/or relatives sufficient to rate completed suicide for 295 (92%), suicide attempts for 228 (71%), and suicidal ideation for 204 (63%) of the 322 patients. Data on suicide attempts and suicidal ideation were coded as missing for patients who were not considered reliable informants and who did not have relatives who could provide pertinent information.

Analyses

Because missing data regarding suicide attempts and ideation was far more frequent than for completed suicide, a two-stage approach to data analysis was used. First, patients dead from suicide were compared with patients who had not committed suicide in relation to positive and negative symptoms (Positive and Negative Syndrome Scale) and two schizophrenia subtype systems. A two-tailed t test was used to assess the significance of differences in positive and negative symptoms among patients who had and had not committed suicide. Chi-square was used to assess the significance of the difference in rate of suicide among patients meeting different subtype criteria.

In the second stage, to evaluate the relationship between risk-related clinical features and suicidal behaviors independent of successful suicide, the subset of patients with complete data for all three suicidal behaviors (N=201) were classified into four nonoverlapping groups: those who had committed suicide (N=19), those who had attempted suicide (N=31), those who had experienced suicidal ideation but had not attempted suicide (N=28), and those who had no suicidal thoughts or behavior (N=123). One-way analysis of variance was used to evaluate the significance of differences in positive and negative symptoms across the four groups simultaneously.

Finally, chi-square analyses were used to assess the relationship between subtype and independent group membership. To balance the risk of type I and type II error, individual positive and negative symptoms associated with suicidal behaviors at $p \leq 0.05$ are reported (although if one were to apply the Bonferroni correction for multiple comparisons, an alpha level of 0.007 [0.05÷7] for individual symptoms might be considered more conservative) (21).

RESULTS

The average patient studied had an illness onset at age 20 in 1951; was first hospitalized at age 24 in 1954; and was hospitalized at Chestnut Lodge at age 28 in 1959 after a mean of 3.2 previous hospitalizations. Mean length of hospitalization was 48 months. Of the 295 patients for whom data on completed suicides were available, slightly less than half (N=134 [45%]) were men, and 88 (30%) had been married at some time before admission.

Follow-up interviews were conducted an average of 18.8 years (SD=8) after index admission. The mean age of the patients at follow-up was 47 years (SD=12). At follow-up, 81 (40%) of the 204 patients for whom data on suicidal ideation were available reported suicidal ideation at some time, and 52 (23%) of the 228 patients for

whom data on suicide attempts were available reported a suicide attempt. Nineteen patients had committed suicide, accounting for 43% of the 44 deaths during the follow-up period. Suicides occurred a mean of 41 months (SD=77) following index hospital discharge; the mean age of the subjects was 41 (SD=9) at the time of death. Eleven (58%) of the 19 patients who committed suicide were men.

The rate of completed suicide across diagnostic groups was 6% (10 of 174) among patients with schizophrenia, 9% (seven of 78) among those with schizoaffective disorder, 8% (one of 13) among those with schizophreniform disorder, and 3% (one of 30) among those with schizotypal personality. The rate of suicide attempts was 23% (30 of 130) among patients with schizophrenia, 24% (16 of 66) among those with schizoaffective disorder, 9% (one of 11) among those with schizophreniform disorder, and 24% (five of 21) among those with schizotypal personality. The rate of suicidal ideation was 38% (43 of 113) among patients with schizophrenia, 42% (25 of 60) among those with schizoaffective disorder, 36% (four of 11) among those with schizophreniform disorder, and 45% (nine of 20) among those with schizotypal personality. No difference in the rate of any suicidal behavior across diagnostic groups was statistically significant at $p<0.05$.

TABLE 1. Severity of Positive and Negative Symptoms at Index Admission Among 295 Patients With Schizophrenia or Schizophrenia Spectrum Disorders Who Did or Did Not Commit Suicide During Long-Term Follow-Up

	Committed Suicide (N=19)		Did Not Commit Suicide (N=276)		Analysis		
Symptom	Mean	SD	Mean	SD	t	df	p
Negative symptoms							
Blunted affect	1.6	1.1	2.3	1.4	2.26	293.00	0.02
Emotional withdrawal	2.1	1.1	2.8	1.6	2.67	23.59	0.01
Poor rapport	2.6	1.5	2.9	1.7	0.72	293.00	n.s.
Social withdrawal	2.0	1.0	2.9	1.7	3.57	26.02	0.001
Abstract thinking	1.6	1.1	2.2	1.5	1.77	293.00	n.s.
Poverty of speech	1.6	1.0	2.2	1.7	2.25	26.05	0.02
Stereotyped thinking	1.3	0.6	1.8	1.3	3.60	32.27	0.001
Global negative	12.8	3.5	17.2	7.8	4.67	32.06	0.0001
Positive symptoms							
Delusions	4.3	1.7	3.5	1.8	–1.96	293.00	0.05
Conceptual disorganization	1.9	1.0	2.4	1.4	1.90	23.45	n.s.
Hallucinations	3.2	1.8	2.5	1.8	–1.70	293.00	n.s.
Excitement	3.3	1.9	2.9	1.6	–1.16	293.00	n.s.
Grandiosity	2.8	2.0	2.1	1.4	–1.66	19.28	n.s.
Suspiciousness	3.6	1.4	2.7	1.4	–2.63	293.00	0.009
Hostility	3.1	2.1	2.8	1.6	–0.52	19.37	n.s.
Global positive	22.3	8.1	18.9	6.5	–2.19	293.00	0.03

Completed Suicide

The severity ratings of positive and negative symptoms at index admission among patients who had or had not committed suicide at follow-up are shown in table 1.

These data indicate a significantly *lower* global negative symptom severity at admission among patients who later committed suicide. Examination of the symptom means in table 1 reveals that, compared with patients who had not committed suicide, patients who committed suicide had lower severity ratings for each of the seven negative symptoms, although the differences for poor rapport and difficulty with abstract thinking were not statistically significant. Although a less robust finding, *greater* severity of two positive symptoms (delusions and suspiciousness) was also associated with completed suicide.

Among 265 of the patients who met criteria for schizophrenia, schizophreniform disorder, and schizoaffective disorder for whom data on completed suicide were available, the paranoid schizophrenia subtype was associated with the greatest risk of suicide and the hebephrenic subtype was associated with the lowest risk of suicide. At follow-up, 13 (12%) of the 112 patients with the paranoid subtype, none of the 26 patients with the hebephrenic subtype, and five (4%) of the 127 patients with the undifferentiated subtype had committed suicide ($\chi^2=7.63$, df=2, $p=0.02$).

The deficit syndrome, ascertained among 295 patients in all diagnostic categories for whom data on completed suicide were available, was associated with a lower risk of suicide. One (1.5%) of the 66 patients with the deficit syndrome and 18 (8%) of the 229 without the deficit syndrome committed suicide during the follow-up period ($\chi^2=2.45$, df=1, $p=0.12$).

Suicide Attempts and Suicidal Ideation

Patients for whom complete data were available for all three suicidal behaviors (N=201) were classified into nonoverlapping groups of those who committed suicide (N=19), those who attempted suicide (N=31), those with suicidal ideation who had not attempted suicide (N=28), and those with no suicidal thoughts or behavior (N=123). Mean Positive and Negative Syndrome Scale scores for these independent groups are given in table 2. One-way analysis of variance revealed a significant ($p\leq0.05$) main group effect for three negative symptoms (blunted affect, poverty of speech, and stereotyped thinking) and for global negative symptom severity. Scheffé post hoc pairwise comparison of means for these variables was significant at the 0.05 level only for global negative symptoms between patients who committed suicide and those with no suicidal behavior. For positive symptoms, a significant main group effect was found only for grandiosity; no groups differed on post hoc pairwise comparisons at the $p\leq0.05$ level.

Although completed suicide was 2.5 times more com-

TABLE 2. Severity of Negative and Positive Symptoms at Index Admission Among 201 Patients With Schizophrenia or Schizophrenia Spectrum Disorders Who Committed Suicide, Attempted Suicide, Had Suicidal Ideation but Did Not Attempt Suicide, or Were Not Suicidal During Long-Term Follow-Up

	Committed Suicide (N=19)		Attempted Suicide (N=31)		Had Suicidal Ideation (N=28)		Were Not Suicidal (N=123)		Analysis	
Symptom	Mean	SD	Mean	SD	Mean	SD	Mean	SD	F (df=3, 197)	p[a]
Negative symptoms										
Blunted affect	1.6	1.1	2.3	1.2	2.0	1.1	2.5	1.4	3.12	0.03
Emotional withdrawal	2.1	1.1	2.6	1.4	2.7	1.6	2.9	1.5	1.6	n.s.
Poor rapport	2.6	1.5	2.5	1.4	2.8	1.4	3.0	1.6	0.9	n.s.
Social withdrawal	2.1	1.0	2.6	1.5	2.8	1.4	3.0	1.7	2.14	n.s.
Abstract thinking	1.6	1.1	2.1	1.3	2.0	1.2	2.2	1.6	1.30	n.s.
Poverty of speech	1.6	1.0	1.8	1.2	1.6	1.0	2.4	1.6	3.54	0.02
Stereotyped thinking	1.3	0.6	1.4	0.9	1.5	0.7	2.0	1.3	4.42	0.005
Global negative	12.8	3.5	15.4	6.4	15.5	5.9	17.9	7.7	3.95	0.009
Positive symptoms										
Delusions	4.3	1.7	3.3	1.8	3.4	1.5	3.5	1.8	1.60	n.s.
Conceptual disorganization	1.9	1.0	2.3	1.1	2.3	1.1	2.5	1.5	1.13	n.s.
Hallucinations	3.2	1.8	2.1	1.4	2.6	1.6	2.3	1.7	2.33	n.s.
Excitement	3.3	1.9	2.6	1.8	3.3	1.8	3.0	1.5	1.14	n.s.
Grandiosity	2.8	2.0	1.9	1.4	1.7	1.2	2.2	1.5	2.60	0.05
Suspiciousness	3.6	1.4	2.5	1.4	2.7	1.3	2.9	1.5	2.46	n.s.
Hostility	3.1	2.1	2.7	1.4	3.2	1.8	2.9	1.5	0.54	n.s.
Global positive	22.3	8.1	17.4	5.6	19.2	6.5	19.3	6.6	2.18	n.s.

[a]n.s.=p>0.05.

mon among patients diagnosed with the paranoid subtype than among patients diagnosed with the nonparanoid subtype and six times less common among patients with the deficit syndrome than among those without the deficit syndrome, independent rates of suicide attempts and suicidal ideation were comparable across subtypes. As a result, independent three (classical subtype) or two (deficit versus nondeficit) by four (suicidal behavior) group chi-squares were nonsignificant for subtype in nonoverlapping group comparisons (χ^2=11.4, df=6, p=0.08 across classical subtypes and χ^2=6.19, df=3, p=0.10 for deficit versus nondeficit).

DISCUSSION

Although it is generally acknowledged that we cannot predict individual suicide, it has been possible to identify predictors of the relative risk for suicidal behaviors (22–27). These efforts may be of particular importance for patients with schizophrenia where suicidal intent is less often directly communicated (28). Several studies (28–32) have found that a high percentage of patients with schizophrenia who die by suicide were seen by an apparently unsuspecting clinician within several days to a week prior to death.

Factors defining those patients with schizophrenia at relatively high risk for suicide have been comprehensively reviewed (5, 7, 12, 33–35) and can be divided into those which are shared with other clinical populations and those which are unique to schizophrenia. As summarized by Caldwell and Gottesman (5), shared risk factors include 1) gender (male), 2) ethnicity (white), 3) social isolation, 4) depression or depressed mood, 5) hopelessness, 6) past history of suicide attempts, 7) family history of suicide, 8) unmarried, 9) unemployed, 10) deteriorating health with good premorbid functioning, 11) recent loss or rejection, 12) childhood parental loss, 13) limited external support, and 14) family stress. Risk factors unique to schizophrenia include 1) age and gender profile (young and male), 2) chronic illness with numerous exacerbations, 3) high psychopathology and impairment at discharge, 4) realistic awareness of illness, 5) fear of further deterioration, and 6) excessive treatment dependence or loss of faith in treatment.

Although previous investigations have suggested an association between schizophrenia subtype and suicide risk (36–38), to our knowledge, rigorously defined positive and negative symptoms and schizophrenia subtypes have not been systematically explored as potential long-term risk factors for suicide in schizophrenia. Our data suggest that negative symptoms, when present as a prominent component of illness, are associated with a significantly *lower* long-term risk of suicide among patients with schizophrenia and schizophrenia spectrum disorders. We found that the nondeficit subtype of schizophrenia, which is based on the absence of enduring negative symptoms, defines a group of patients whose risk for suicide is six times greater than that of patients with the deficit subtype. Conversely, two positive symptoms (suspiciousness and delusions) appear to be associated with an elevated long-term risk of suicide. The paranoid subtype of schizophrenia, which emphasizes positive symptoms and the absence of negative symptoms, is associated with a suicide risk that is three times greater than the risk associated with nonparanoid subtypes and eight times greater than the risk associated with the deficit subtype.

The relationship between symptoms and schizophrenia subtype and the risk of suicidal ideation or suicide

attempts appears more complex. The mean severity ratings of most negative symptoms among independent groups of patients with suicidal ideation and attempts were found to be intermediate between the lower ratings of symptom severity for patients who committed suicide and the higher negative symptom ratings among those with no suicidal ideation or behavior. Therefore, if in clinical samples, fewer negative symptoms are found among groups of patients with suicidal ideation and/or suicide attempts, this may be mostly accounted for by the subset of patients embedded in these groups who ultimately go on to complete suicide. Similarly, overall differences between subtypes in frequency of suicidal ideation and attempts might be substantially accounted for by prelethal suicidal behaviors in the subset of patients at greatest risk for future completed suicide.

The findings of this study must be viewed in relation to strengths and limitations imposed by our retrospective methods of symptom assessment, ascertainment of suicidal behaviors, and specific atypical aspects of the patients studied. Symptom severity at index admission was rated on the basis of a prolonged 9-month window of observation. To be rated as severe, negative and positive symptoms had to be marked in severity and present over all or most of this period. It is unlikely that ratings derived from a single cross-sectional assessment and hence potentially subject to state-related fluctuations would be of comparable predictive utility. Our findings, therefore, reflect an association between predominant illness symptom type over a 9-month period and long-term suicide risk. It is important to note that symptoms and other potentially relevant factors proximate to the actual suicidal events were not recorded in this study but have been described in studies of other patients as heterogeneous (11, 13, 39).

In addition to being skewed toward chronic forms of schizophrenia, patients treated at Chestnut Lodge during the decades of this study were uniformly socially advantaged and rarely received medication early in the course of their illness. Generalization to current patient populations who receive early and aggressive psychopharmacological treatment and to less advantaged patient populations may accordingly be limited. Our reliance on patient and family interviews to assess suicidal behavior is an additional limitation of this investigation, and the use of empirical criteria for the determination of suicide would likely improve the accuracy of ascertainment (40). The comparatively higher percentage of patients who could not be rated for suicidal ideation and/or suicide attempts weakens confidence in the findings for these behaviors. Finally, although patients with schizophrenia and schizophrenia spectrum disorders were grouped together for analysis, differential predictors across disorders is possible and might be identified if a larger sample were available.

Organizing available data concerning suicide risk factors into a coherent clinical profile, Drake et al. (33, 41, 42) noted that schizophrenic patients who kill themselves tend to be younger and to have good premorbid functioning and high self-expectations for performance. Suffering from a recurrent illness with numerous relapses, they find themselves neither able to achieve these expectations nor able to relinquish them and accept the limitations and disabilities imposed by mental illness. Suicide may emerge from a nondelusional but acutely painful awareness of the illness process, negative expectations of the future, depleted self-esteem, and hopelessness. Related states of dysphoria leading to suicide among patients with schizophrenia have been described as severe disappointment over failed expectations (6), pervasive distress, loneliness, and dissatisfaction (43), hopelessness, fatigue, and awareness of the gradual deterioration of abilities (44), despair and dissatisfaction with the results of treatment (45), and a final response to a chronic and deteriorating situation (46).

Our findings appear consistent with these formulations to the extent that the progressive loss of social drive, the diminished capacity to experience affect, and the indifference toward the future associated with deficit symptoms, although often markedly disabling, may preclude the painful self-awareness associated with suicide. In contrast, the good premorbid functioning, late illness onset, preservation of affect and cognitive capacities, and intermittent course associated with nondeficit and paranoid subtypes of schizophrenia encompass many of the preconditions for the emergence of dysphoric and hopeless states.

The construction of a clinical judgment regarding suicidality in a particular individual at a particular time obviously extends considerably beyond eliciting the presence or absence of specific risk factors (47). Nonetheless, a clinician's awareness of these factors may usefully serve to prompt further inquiry and vigilance among patients in actuarially defined high-risk groups.

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