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Time to emergence of severe suicidal ideation among psychiatric patients as a function of suicide attempt history

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Abstract

Background: Little is known about the emergence of suicidal ideation among psychiatric inpatients with histories of no, single, or multiple suicide attempts. We investigated differences in time to reemergence of severe suicidal ideation among psychiatric patients as a function of their suicide attempt histories.

Method: One hundred seventeen individuals meeting criteria for a major depressive disorder who were recently discharged from a psychiatric hospital and participating in a larger study of treatments for depression were included in the current study. Suicidal ideation, depressive symptoms, hopelessness, and depressogenic cognitions were assessed at baseline, and suicidal ideation was assessed at 3-, 6-, 12-, and 18-month follow-up, as well as inpatient readmission if applicable. Time to the reemergence of severe suicidal ideation was analyzed using survival analysis.

Results: Twenty-two percent of our sample reported the occurrence of severe suicidal ideation over an 18-month period. Severe suicidal ideation emerged earlier among patients who had a history of prior suicide attempts than those who did not, but single and multiple suicide attempters did not differ significantly in time to severe suicidal ideation. Suicide attempt history remained a significant predictor of time to severe suicidal ideation when statistically controlling for hopelessness, depressive symptoms, depressogenic cognitions, and suicidal ideation at admission and initial treatment group assignment, especially between single attempters and nonattempters.

Conclusions: Although nearly a quarter of participants endorsed severe, clinically significant suicidal ideation within 18 months of discharge, those with suicide attempt histories reported the occurrence of severe suicidal ideation significantly earlier than those without suicide attempt histories.

1. Background

Suicidal ideation, attempted suicide, and death by suicide represent a range of suicidal behaviors. Although death by suicide is a low-base-rate behavior, occurring in approximately 0.01% of the population in 2003 [1], the prevalence of suicidal ideation is significantly higher. Between 11% and 17% of individuals living in the United States report some suicidal ideation during their lifetime [2,3]. Suicidal ideation represents an important public health problem because of increased use of mental health services [4], the distress it causes the individual and others, its implications for the mental health of the individual, and its role as a risk factor for death by suicide [5]. Individuals reporting suicidal ideation or attempted suicide are likely to experience enduring suicidal ideation [6], and those reporting suicidal ideation are more likely to attempt suicide in the future [5,7].

The emergence of suicidal ideation is of both empirical and clinical interest. For instance, the Food and Drug Administration's public health advisories of increased suicidal behavior in children and adolescents [8], and, later, adults [9], being treated with antidepressants has generated recent interest in the emergence of suicidal thoughts and behaviors among individuals receiving pharmacotherapy [10,11]. However, the length of time to emergence of severe suicidal ideation after inpatient treatment has been little studied. In one study among adolescents, emergence was most common within the first 2 years after the initial assessment [12]. Further research on the emergence of suicidal ideation is necessary to better

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understand suicidality and to develop intervention and prevention efforts better timed to periods of heightened risk. Research on the topic generally has focused on the presence or absence of suicidal ideation without accounting for ideation severity. However, the severity of suicidal ideation is of clinical importance and may vary in its clinical significance (that is, experiencing thoughts of death vs having a suicide plan). To the best of our knowledge, there have been no studies investigating time to the emergence of clinically significant suicidal ideation either in adult psychiatric patients or as a function of suicide attempt status.

Although traditionally classified together, recent research has suggested that individuals with a history of multiple suicide attempts differ from those with a history of a single attempt. Specifically, multiple attempters report more symptoms of hopelessness, depression, and anger than single attempters after a suicide attempt [13,14]. Individuals with a history of multiple attempts report more suicidal intent [15] and are more likely to attempt suicide in the 5 years after inpatient discharge than those with a history of a single attempt [16,17]. Furthermore, individuals with a history of multiple suicide attempts report higher levels of suicidal ideation than those with a history of a single attempt [14] and are more likely than single attempters and nonattempters to report increased suicidal ideation within 12 months after a suicidal crisis [18].

The purpose of this study was to investigate differences in time to emergence of clinically significant suicidal ideation, reflecting high levels of ideation, desire for death, preparation, and resolve [19], among adult psychiatric patients with histories of no, single, or multiple suicide attempts. Using survival analysis, we explored length of time from hospital discharge to emergence of clinically significant, severe, suicidal ideation as a function of suicide attempt status. In addition, we investigated whether suicide attempt status would be a stronger predictor of time to severe suicidal ideation than other factors associated with suicidal ideation, such as hopelessness and depression [20], negative cognitive styles [21,22], and recent suicidal ideation [23].

2. Method

2.1. Participants

This study consisted of 121 patients recently admitted to a psychiatric inpatient or partial hospital unit who were participating in a larger longitudinal study on the efficacy of combined psychosocial and pharmacologic treatments for depression [24], which was approved by the hospital's institutional review board. Additional details regarding the protocol and outcomes of the treatment study can be found in Miller et al [24]. Individuals included in the study were between 18 and 65 years of age, met criteria for a diagnosis of major depressive disorder obtained through the Structured Clinical Interview for the *Diagnostic and Statistical Manual of Mental Disorders, Third Edition* (SCID-P) [25], reported scores of more than 17 on both the Beck Depression Inventory (BDI) [26] and the Modified Hamilton Rating Scale for Depression (MHRSD) [27], had sufficient reading skills to complete questionnaires, were currently living with at least 1 family member, and had informed consent from both them and their families. Individuals were excluded from participating if they met criteria for a current diagnosis of borderline personality disorder, bipolar disorder, schizophrenia, substance dependence, or somatization disorder; had a primary diagnosis of posttraumatic stress disorder; had a medical illness that contraindicated antidepressant medication; or were prevented, by significant cognitive impairment, from completing questionnaires.

2.2. Assessments

Assessments took place at hospital admission, hospital discharge, and 3, 6, 12, and 18 months after discharge. In addition, assessment measures were administered at the time of hospital readmission, if applicable. Assessments were conducted in person whenever possible and by telephone when necessary. Most patients (76%, 92/121) completed assessments through the 18-month follow up.

2.3. Measures

Patients were interviewed for specific information regarding suicide attempts, such as number of attempts and age at first attempt. In addition, demographic variables, including patient age and ethnicity, were obtained during this interview. The Modified Scale for Suicidal Ideation (MSSI) [28], an 18-item interview modified from the Scale for Suicidal Ideation [29], was used to assess patients' levels of suicidal ideation. The scale consists of 2 factors: Suicidal Desire and Ideation, and Resolved Plans and Preparation [19]. Excellent internal consistency and concurrent validity have been reported in clinical samples [30], and the scale has been used in a number of research studies. A score of 21 on the MSSI was defined as a cutoff for severe levels of suicidal ideation [28], reflecting high levels and frequency of suicidal thoughts and desires, resolve, and a developed plan [19]. Depressive symptoms were assessed using the BDI [26], a self-report measure, and the MHRSD [27], a clinician-administered interview. The BDI and MHRSD are commonly used in research, and research has demonstrated strong reliability and validity in clinical samples for both measures [27,31]. The Beck Hopelessness Scale (BHS) [32] was used to assess the individual's negative expectations about the future. This commonly used measure has demonstrated strong reliability and validity across several populations [33]. Depressogenic cognitions were measured with the Dysfunctional Attitude Scale (DAS) [34] and the Cognitive Bias Questionnaire (CBQ) [35]. The DAS consists of 40 items designed to measure beliefs that may represent a cognitive vulnerability to depression. Studies have reported excellent internal consistency and moderate validity against a measure of depressive symptoms [36]. The CBQ was

designed to measure negatively biased cognitive styles by assessing an individual's typical response for a given scenario. The depressed-distorted subscale, which assesses unrealistically negative cognitive style, was included in this study's analyses. The CBQ correlates significantly with measures of depression and negative self-statements [37].

2.4. Treatment

Upon discharge from the hospital, participants were randomized to receive 1 of 4 treatment conditions that were either "matched" or "mismatched" to their pretreatment level of deficits for a 6-month period. The treatment conditions included pharmacotherapy alone; pharmacotherapy and cognitive therapy; pharmacotherapy and family therapy; and pharmacotherapy, cognitive therapy, and family therapy. See Miller et al [24] for greater detail regarding the randomization procedures and treatment conditions.

During this 6-month period, a subset of patients (19%, 23/121) who manifested significant deterioration or suicide risk were removed from their randomized treatment and, if clinically appropriate, were provided with another or additional study treatment or referred outside the study for treatment. Another 20% (24/121) of patients dropped out of randomized treatment during the first 6 months. After 6 months, individuals who completed randomized treatment and had responded to treatment continued with that intervention for an additional 12 months (55.4%, 67/121). Those who had not responded were referred outside the study to another treatment. During the entire study, patient assessment continued regardless of treatment status. That is, we attempted to complete assessments on all patients initially entered into the study. Thus, it is important to note that data included in this report are largely naturalistic because treatment was randomly assigned for only the first 6 months of the 18-month study, and only a subset of patients who did not drop out actually received randomized treatment.

2.5. Statistical analysis

Group differences were analyzed using analyses of variance and χ^2 analyses when appropriate. Time to emergence of severe suicidal ideation was investigated using survival analysis. This set of statistical procedures is used to model time until an event occurs, or survival time, and uses survival time as the dependent variable in analyses. Survival analysis also incorporates incomplete survival time by analyzing censored data. In the current study, the Kaplan-Meier method was used to determine differences in survival time among the groups, and the Cox proportional hazard regression was used to investigate predictors of survival time [38,39]. All data analyses were performed using SPSS, version 13 (SPSS, Chicago, Ill).

3. Results

Although 121 psychiatric patients participated in the original treatment outcome study [24], 4 of these participants (1 single attempter and 3 multiple attempters) were excluded from the current study because they endorsed severe suicidal ideation (MSSI score of 21 or more) at discharge. Of the 117 participants included in this study, 70 (57.9%) reported no history of a suicide attempt, whereas 20 (17.1%) reported a single attempt, and 27 (23.1%) reported multiple attempts. Descriptive statistics for our sample are presented in Table 1. The groups did not differ significantly in sex, age, ethnicity, marital status, or treatment group assignment at randomization. However, significant group differences were found for mean suicidal ideation at admission ($F_{2,117} = 17.01$, $P < .001$) and discharge ($F_{2,117} = 6.73$, $P = .002$), with single and multiple attempters reporting more suicidal ideation at admission and discharge than nonattempters and multiple attempters reporting more suicidal ideation at admission than single attempters. It is important to note that group means at

Table 1
Group demographics (no attempt, single attempt, multiple attempt) on relevant variables

	No attempt (n = 70)	Single attempt (n = 20)	Multiple attempt (n = 27)	*df*	χ^2/F
Sex (% women)	68.6	85.0	77.8	2	2.49
Ethnicity (% white)	94.3	95.0	92.6	2	0.14
Age (y)	39.43 (12.24)	35.40 (10.60)	36.89 (11.58)	2, 116	1.10
Marital status (% married)	68.6	76.2	60.0	2	1.53
Admission MSSI	14.19 (12.19)[a]	20.90 (11.90)[b]	29.56 (13.38)[c]	2, 115	15.15 **
Discharge MSSI	0.99 (3.03)[a]	3.10 (4.11)[b]	2.92 (5.04)[b]	2, 113	3.83 *
Admission BDI	32.24 (7.78)[a]	32.85 (9.32)[a,b]	36.78 (8.23)[b]	2, 116	3.06 *
Admission MHRSD	36.56 (6.10)[a]	36.50 (6.48)[a,b]	39.89 (6.15)[b]	2, 116	3.05 *
Admission BHS	14.49 (5.01)	15.50 (5.11)	16.15 (3.84)	2, 116	1.29
Admission DAS	154.50 (42.37)	162.15 (38.74)	164.30 (45.22)	2, 116	0.63
Admission CBQ	2.94 (2.98)	3.75 (3.13)	4.19 (3.63)	2, 116	1.68
Treatment group				6	7.37

Unless otherwise specified, values in cells represent means, and values in parentheses represent SDs. χ^2 tests were used for tests involving sex and ethnicity; all other analyses were conducted using analyses of variance. Means with different superscripts differ significantly at $P < .05$.

* $P < .05$.

** $P < .001$.

discharge from the hospital reflected low suicidal ideation according to the measure's cutoff scores [28]. Groups also differed significantly in depressive symptoms at admission as reported on the BDI ($F_{2,116} = 3.06$, $P = .05$) and MHRSD ($F_{2,116} = 3.05$, $P = .05$), with multiple attempters reporting more depressive symptoms than nonattempters. Groups did not differ in the occurrence of rehospitalization after hospital discharge ($\chi^2_2 = 2.32$, N = 117, $P = .31$). Initial treatment group assignment was not significantly associated with suicide attempt status ($\chi^2_6 = 9.81$, N = 117, $P = .13$) or the MSSI at admission ($F_{3,115} = 0.67$, $P = .57$).

A review of clinical team notes revealed 5 suicide attempts during the assessment period. Two individuals attempting suicide during the study reported no previous attempts at baseline, 1 reported 1 previous attempt, and 2 reported multiple previous attempts. There were no deaths by suicide during the assessment period. Twenty-six (22.2%) of the 117 participants reported the occurrence of severe levels of suicidal ideation during follow-up, and approximately 7% (n = 8) of participants reported recurrent severe suicidal ideation (defined as severe suicidal ideation at more than 1 time point during the follow-up period). Although patients with a history of suicide attempts were more likely to report the emergence of severe suicidal ideation during follow-up than nonattempters ($\chi^2_1 = 15.06$, N = 117, $P = .001$), the difference between single and multiple attempters was not significant ($\chi^2_1 = 0.003$, n = 47, $P = .96$). As shown in Table 2, participants reporting the emergence of severe suicidal ideation during follow-up were more likely to report greater suicidal ideation at admission ($t_{114} = 3.94$, $P < .001$) and discharge ($t_{112} = 2.53$, $P = .01$), and greater dysfunctional attitudes on the DAS ($t_{115} = 2.16$, $P = .03$). They did not differ with regard to initial treatment group assignment ($\chi^2_3 = 5.28$, N = 117, $P = .15$); depressive symptoms at admission (BDI: $t_{115} = 1.17$, $P = .24$; MHRSD: $t_{115} = 1.78$, $P = .08$); age ($t_{115} = .49$, $P = .63$); sex ($\chi^2_1 = 0.003$, N = 117, $P = .96$); ethnicity ($\chi^2_1 = 0.27$, N = 117, $P = .60$); or marital status ($\chi^2_1 = 0.34$, N = 117, $P = .56$).

Table 2
Group demographics (reemergence of severe suicidal ideation) on relevant variables

	No reemergence (n = 91)	Reemergence (n = 26)	*df*	χ^2/F
Sex (% women)	73.6	73.1	1	0.003
Ethnicity (% white)	93.4	96.2	1	0.27
Age (y)	38.44 (11.71)	37.15 (12.52)	115	0.49
Marital status (% married)	67.0	73.1	1	0.34
Admission MSSI	16.36 (13.33)	27.81 (12.11)	114	3.94***
Discharge MSSI	1.31 (3.08)	3.46 (5.71)	112	2.53**
Admission BDI	32.91 (8.15)	35.08 (8.77)	115	1.17
Admission MHRSD	36.77 (6.16)	39.23 (6.45)	115	1.78
Admission BHS	14.73 (4.93)	16.15 (4.20)	115	1.34
Admission DAS	153.57 (40.44)	173.81 (45.75)	115	2.19*
Admission CBQ	3.07 (2.97)	4.42 (3.71)	115	1.94
Treatment group			3	5.28

Unless otherwise specified, values in cells represent means, and values in parentheses represent SDs. χ^2 tests were used for tests involving sex and ethnicity; all other analyses were conducted using analyses of variance.

* $P < .05$

** $P < .01$.

*** $P < .001$.

Table 3
Cumulative percentage reporting of the occurrence of severe suicidal ideation

	Nonattempters	Single attempters	Multiple attempters
Discharge	0%	0%	0%
3 mo	1%	0%	8%
6 mo	3%	22%	24%
9 mo	6%	34%	41%
12 mo	6%	40%	41%
15 mo	9%	40%	46%
18 mo	9%	40%	46%

Next, we investigated differences in time to emergence of severe suicidal ideation using survival analysis. Cumulative survival time is presented in Table 3. We performed a Kaplan-Meier analysis to examine whether individuals differed in the likelihood of eventually reporting severe levels of suicidal ideation based on suicide attempt status. Including individuals who did not report severe suicidal ideation during the follow-up period, estimated mean time to severe suicidal ideation differed significantly among nonattempters, single attempters, and multiple attempters (17.06, 12.79, and 11.98 months, respectively; log-rank = 19.51, $df = 2$, $P < .001$; Breslow = 20.30, $df = 2$, $P < .001$; Tarone-Ware = 20.02, $df = 2$, $P < .001$; see Table 4). Pairwise comparisons revealed significant differences between nonattempters and single attempters (Wilcoxon = 12.07, $df = 1$, $P = .001$) and nonattempters and multiple attempters (Wilcoxon = 15.42, $df = 1$, $P < .001$), with nonattempters reporting a longer duration than single or multiple attempters. The difference between single and multiple attempters was not significant (Wilcoxon = 0.03, $df = 1$, $P = .87$).

A Cox proportional hazard regression was used to investigate whether suicide attempt status predicted time to severe suicidal ideation above other known predictors of suicidal ideation. We found that history of 1 or more suicide attempts was predictive of time to severe suicidal ideation (Wald = 5.01, $df = 1$, $P = .03$, $\beta = 1.09$), even when controlling for initial treatment group assignment and

Table 4
Comparison of survival times by attempt status

Group	No. of events	Mean survival time (mo)	95% CI
Nonattempter	7	17.06	16.23-17.90
Single attempter	8	12.79	9.51-16.07
Multiple attempter	11	11.98	9.25-14.72
All participants	26	15.26	14.23-16.29

CI indicates confidence interval. For the log-rank significance test, the value was 19.51 ($df = 2$), $P < .001$; for Breslow, the value was 20.30 ($df = 2$), $P < .001$; for Tarone-Ware, the value was 20.02 ($df = 2$), $P < .001$.

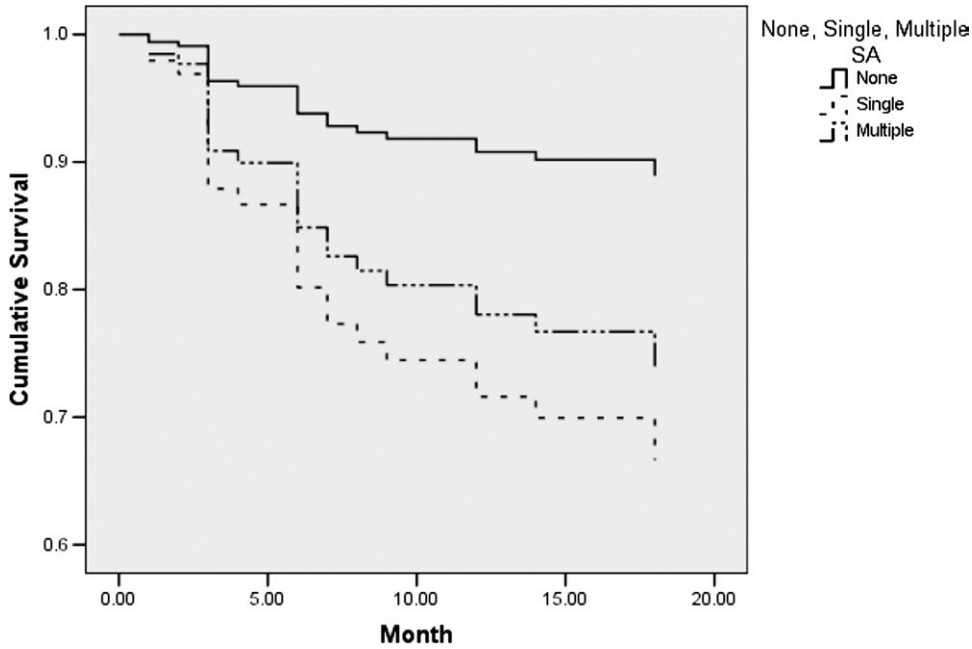

Fig. 1. Cox proportional hazard regression survival curve.

hopelessness, depressive symptoms, depressogenic cognitions, and suicidal ideation at admission. Compared with nonattempters, single-attempt status predicted time to suicidal ideation (Wald = 5.94, $df = 1$, $P = .02$, $\beta = 1.35$), but multiple-attempt status did not (Wald = 2.20, $df = 1$, $P = .14$, $\beta = .95$). Multiple attempters did not differ significantly from single attempters in time to severe suicidal ideation (Wald = .29, $df = 1$, $P = .59$, $\beta = .30$). Time to severe suicidal ideation was also predicted by suicidal ideation at admission (Wald = 4.37, $df = 1$, $P = .02$, $\beta = .04$) but not depressive symptoms (BDI: Wald = 0.04, $df = 1$, $P = .84$, $\beta = .01$; MHRSD: Wald = 0.14, $df = 1$, $P = .71$, $\beta = .01$); hopelessness[1] (Wald = 0.29, $df = 1$, $P = .59$, $\beta = .03$); depressogenic cognitions (DAS: Wald = 0.83, $df = 1$, $P = .36$, $\beta = .01$; CBQ: Wald = 0.02, $df = 1$, $P = .88$, $\beta = .02$) at admission; or initial treatment group assignment (Wald = 0.93, $df = 1$, $P = .33$, $\beta = .20$). The overall model fit was significant ($\chi^2_{11} = 30.33$, $P = .001$), and the survival curve as a function of suicide attempt status is shown in Fig. 1.

4. Discussion

The purpose of this study was to investigate differences in time to emergence of severe suicidal ideation among psychiatric patients as a function of their suicide attempt histories. Overall, we found that the attempt history groups differed in their time to severe suicidal ideation. Specifically, severe suicidal ideation emerged earlier for single and multiple attempters than for patients with no prior history of suicide attempts. Single and multiple attempters, however, did not differ significantly from each other. Furthermore, although suicidal ideation at admission was a significant predictor of time to emergence of severe suicidal ideation during follow-up, history of a suicide attempt continued to predict time to emergence when statistically controlling for treatment group assignment at randomization and the effects of suicidal ideation, hopelessness, depressive symptoms, and depressogenic cognitions at admission.

Time to the emergence of severe suicidal ideation has implications for our understanding of and clinical work with psychiatric patients. These findings suggest that psychiatric patients who have attempted suicide will likely experience severe suicidal ideation earlier after hospital discharge than those who have not attempted suicide. Despite intensive treatment, nearly a quarter of our sample (22.2%) reported the occurrence of severe suicidal ideation within the 18-month follow-up period, and 7% reported recurrent severe suicidal ideation. The prevalence of emerging severe suicidal ideation, especially among those who have attempted suicide, emphasizes the need for continued clinical care and monitoring.

Results of this study suggested no difference in time to severe, clinically significant suicidal ideation based on frequency of suicide attempts (single vs multiple) and indicated that individuals with a history of suicide attempts are similar in their time to emergence of clinically significant suicidal ideation, regardless of frequency. Data also suggested that history of multiple suicide attempts did not

[1] Although hopelessness was predictive of time to emergence at lower severities of suicidal ideation (cutoff of 8: Wald = 5.27, df = 1, P = .02, β = .09; cutoff of 15: Wald = 4.76, df = 1, P = .03, β = .11), hopelessness did not predict above suicide attempt status, suicidal ideation at admission, depressive symptoms, depressogenic cognitions, and treatment group assignment (cutoff of 8: Wald = .54, df = 1, P = .46, β = .03; cutoff of 15: Wald = 1.58, df = 1, P = .21, β = .07).

predict time to severe suicidal ideation above other predictors of suicidal ideation, including hopelessness, depressive symptoms, and depressogenic cognitions, whereas history of a single attempt did. However, these findings contradict previous research suggesting that multiple attempters may be at higher risk for suicidal behaviors than single attempters [14]. In a naturalistic study investigating time to suicide attempt after hospital discharge among adolescents, Goldston et al [17] reported that those with histories of multiple attempts were twice as likely as single attempters or nonattempters to attempt suicide in the 5 years after discharge. However, posthospitalization treatment was not reported in the study, and differences in sample characteristics and outcome variable limit generalizability from Goldston et al [17] to the current study. It is possible that although single and multiple attempters do not differ in time to the emergence of severe suicidal ideation, multiple attempters may simply be more likely to act on this ideation and make a subsequent attempt. Future studies focused on the emergence of both ideation and attempts are needed to test this hypothesis.

Patients' participation in treatment may have impacted reported suicidal ideation in the current study and may account for inconsistencies between this study's findings and previous research. It is important to note that all participants received mental health treatment while on the inpatient unit and outpatient treatment for at least the first 6 months after discharge from the hospital. In addition, participants either continued treatment for another 12 months or were referred to another type of treatment based on their response to the initial 6 months of treatment. Because of the large number of potential treatments and the uncontrolled nature of much of the treatment received by participants, we were unable to provide substantial data on the relationship of treatment to the course of suicidal ideation. However, Kessler et al [40] found that although treatment utilization increased over a 10-year period from 1990-1992 to 2001-2003, there was no corresponding decrease in suicidal behaviors. Future studies designed to investigate the effect of specific treatments on the course of suicidal ideation and behavior are needed to address this important issue.

Nearly a quarter of participants did not complete assessments to the 18-month follow-up point. Although survival analysis considers censored data of those who do not experience the event before their termination from the study, this may limit the generalizability of the findings. In addition, although the current authors chose to investigate time to severe suicidal ideation because of its clinical utility and importance, future studies may investigate time to mild or moderate suicidal ideation. Future studies may also investigate the effects of changes in predictors of suicidal ideation over time, such as changes in depressive symptoms, on the emergence of suicidal ideation.

This study adds to the limited body of literature on the emergence of severe suicidal ideation in psychiatric patients and single attempters, multiple attempters, and nonattempters. To the best of our knowledge, this is the first study to investigate time to emergence of clinically significant suicidal ideation in adult psychiatric patients or as a function of previous suicide attempts. Suicidal ideation affects a significant percentage of the population and is an important area of research of its own right and as a risk factor for death by suicide [5]. Understanding the natural course of its emergence, as well as risk and protective factors to time of emergence, will enable us to better understand suicidal ideation and its clinical implications, such as optimal timing of prevention measures.

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