Risk Factors for Suicide in Psychiatric Outpatients: A 20-Year Prospective Study

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To determine the risk factors for suicide, 6,891 psychiatric outpatients were evaluated in a prospective study. Subsequent deaths for the sample were identified through the National Death Index. Forty-nine (1%) suicides were determined from death certificates obtained from state vital statistics offices. Specific psychological variables that could be modified by clinical intervention were measured using standardized scales. Univariate survival analyses revealed that the severity of depression, hopelessness, and suicide ideation were significant risk factors for eventual suicide. A multivariate survival analysis indicated that several modifiable variables were significant and unique risk factors for suicide, including suicide ideation, major depressive disorder, bipolar disorder, and unemployment status.

Suicide is the eighth leading cause of death and was responsible for approximately 31,500 deaths in 1997 in the United States according to the most recent mortality statistics available from the National Center for Health Statistics (Hoyert, Kochanek, & Murphy, 1999). Given the relative infrequency of suicide, however, the identification of risk factors for suicide has been problematic (Murphy, 1984). Although previous studies have attempted to investigate suicide by studying a more frequent behavior, nonfatal suicide attempts, conclusions regarding the actual risk for suicide are tenuous (Maris, Berman, Maltzberg, & Yufit, 1992). Large samples, a prospective study design, and long-term follow-up are important components that are required for validating potential risk factors.

Although the estimated suicide rate in the general population is 0.01% (Hoyert et al., 1999), the rate among the psychiatric population is approximately 1% (Babigian & Odoroff, 1969; Pokorny, 1964). Several prospective studies have been conducted to identify risk factors in psychiatric populations (for a review, see Mościcki, 1999). These studies have identified a variety of nosological risk factors, such as mood disorders, schizophrenia, psychotic, substance abuse or dependence, and personality disorders. Other clinical and demographic risk factors that have been identified include hopelessness, suicide ideation, previous psychiatric treatment, previous suicide attempts, and a family history of mental disorder. High-risk groups include patients who are male, unemployed, widowed, or divorced. Although many potential variables have been studied, few have emerged consistently as replicable risk factors, possibly because of the variability in study design, sample selection, and analyses performed across studies.

Despite Leon, Friedman, Sweeney, Brown, and Mann's (1990) recommendation to use survival analyses for identifying risk factors for suicide to control for censoring effects, such as the differential lengths of follow-up or the cohort effects of death by other means, only a few studies have actually used this technique. For example, Nordström, Åberg, Åberg-Wistedt, and Nordin (1995) found that psychiatric inpatients with mood disorders who had recently attempted suicide had a higher risk of suicide than patients with mood disorders who had not attempted suicide, particularly within the 1st year of follow-up.

Most prospective studies that have investigated risk factors for suicide have been conducted with hospitalized psychiatric patients. Conclusions regarding the identification of risk factors with inpatient samples, however, may not necessarily be generalizable to outpatient populations because of several important differences in sample selection. For example, the proportion of patients who have reported recent suicide ideation or have attempted suicide is much larger for inpatients than for outpatients (Black, Warrack, & Winkler, 1985). Hence, there may be considerable variation in the degree of risk for such variables depending on the study setting. Because most psychiatric patients are seen in outpatient facilities, it is important to determine the specific risk factors for this population.
The present study was undertaken in 1975 to determine the risk for suicide associated with psychological, demographic, diagnostic, and psychiatric history variables. This study is one of the few empirical investigations to use a large sample size, a prospective design, and standardized measures to examine the risk for suicide. The risk of death from natural causes is also presented to compare the discriminant predictive validity of the proposed risk factors with respect to suicide.

**Method**

**Patients**

The sample consisted of 6,891 psychiatric outpatients who were consecutively evaluated at the Center for Cognitive Therapy (CCT) of the University of Pennsylvania between January 1, 1975, and December 31, 1995.

**Data Collection**

After obtaining written informed consent from the patient, a doctoral-level clinician administered a standard intake battery of psychological measures. In addition, patients were diagnosed with consecutive editions of the Structured Clinical Interview for DSM-III or DSM-III-R (SCID; Spitzer, Williams, Gibbon, & First, 1990) since 1983. For the present study, all of the diagnoses were translated into Diagnostic and Statistical Manual of Mental Disorders (4th ed.; American Psychiatric Association, 1994) disorders and then classified into major diagnostic categories. The translation of previous diagnostic categories into DSM-IV categories followed the guidelines and comparative listings presented in the appendixes of consecutive releases of the American Psychiatric Association's (1980, 1987) diagnostic manuals.

**Measures**

**Scale for Suicide Ideation (current; SSI-C)**. The 19-item SSI-C (Beck, Kovacs, & Weissman, 1979) was used to evaluate the current intensity of the patients' specific attitudes, behaviors, and plans to commit suicide. Each item consists of three options, graded according to the intensity of the suicidality, using a 3-point scale ranging from 0 to 2. The ratings are summed to yield a total score ranging from 0 to 38. Individual items assess characteristics such as wish to die, desire to make an active or passive suicide attempt, duration and frequency of ideation, sense of control over making an attempt, number of deterrents, and amount of actual preparation for a contemplated attempt. The SSI-C has been found to have moderately high internal consistency and good concurrent and discriminant validity for psychiatric outpatients (Beck, Brown, & Steer, 1997).

**Beck Hopelessness Scale (BHS)**. The BHS consists of 20 true–false statements designed to assess the extent of positive and negative beliefs about the future. It is scored by summing the keyed responses of pessimism for each of the 20 items. The BHS total score ranges from 0 to 20. Adequate internal reliability has been reported for the BHS across diverse clinical and nonclinical populations, with KR-20s typically in the .80s. The correlations for the BHS with clinical ratings of hopelessness are in the .70s (Beck & Steer, 1988).

**Beck Anxiety Inventory (BAI)**. The 21-item BAI is a 21-item self-report instrument designed to assess the intensity of anxiety symptoms. The BAI items are rated with 4-point rating scales ranging from 0 to 3; total scores range from 0 to 63. The BAI possesses high internal consistency and correlates significantly with other measures of anxiety (Beck & Steer, 1990).

**Beck Depression Inventory (BDI)**. The BDI is a 21-item self-report instrument used to measure the severity of depression in adults and adolescents. Each of the 21 symptoms is represented by four statements reflecting increasing levels of severity, and each item is rated from 0 to 3. The BDI is scored by summing the 21 ratings, and the total score ranges from 0 to 63. A number of studies have described the high internal reliability and validity of the BDI with respect to diverse psychiatric samples (Beck & Steer, 1987).

**Revised Hamilton scales**. The Hamilton Psychiatric Rating Scale for Depression (Hamilton, 1959) and the Hamilton Anxiety Rating Scale (HARS; Hamilton, 1960) were administered by clinicians to assess the severity of depression and anxiety, respectively. The scoring of these scales has been revised to improve the internal reliability and discriminant validity of the rating scales with respect to depressive and anxiety disorders. The revised, 16-item Hamilton Psychiatric Rating Scale for Depression (HRSD–R) and the revised, 13-item Hamilton Anxiety Rating Scale (HARS–R) have demonstrated adequate reliability and validity in psychiatric outpatients (Riskind, Beck, Brown, & Steer, 1987).

**Follow-Up Procedure**

Deaths of individuals in the sample were ascertained by use of the National Death Index (NDI). The NDI is a centralized computer database of death record information compiled from data submitted annually by individual state vital statistics offices. This database was established in 1979. Identifying information provided by the user is matched with corresponding information in the NDI database. Possible matches were compared with the intake records according to specific criteria outlined by the NDI (U.S. Department of Health and Human Services, National Center for Health Statistics, 1981). When a match was made, a copy of the death certificate for each patient was obtained from the particular state's vital statistics office to determine the cause of death.

Although the NDI was not available prior to 1979, patients were followed from 1975 to 1978 by contacting patients, family members, or relevant agencies (hospitals, coroner's office, etc.). If a patient had died during the follow-up period, then a death certificate was obtained from the state vital statistics office. It was possible to follow 100% of the 1975–1979 cohort during this time period (Beck & Steer, 1989). The median length of follow-up was 10 years, the range was from less than 1 year to 20 years, and the interquartile range was 9 years.

**Statistical Methods**

We conducted nonparametric survival analyses using Cox's proportional hazard regression model (Allison, 1995) to identify risk factors for suicide while controlling for censoring effects due to the differential length of follow-up. Prior to conducting these analyses, we performed a series of graphical procedures using the SAS Institute's (1996) PHREG procedure for ascertaining whether the hazard functions for the censored and non-censored cases were parallel using Allison's SMOOTH procedure. The primary outcome variable was the occurrence of a suicide. The length of follow-up for each patient who died from suicide or other causes is represented by the number of days between the date of evaluation and the date of death. Data from patients who died were censored at the date of death. Data from surviving patients were censored as of December 31, 1995.

The cumulative hazard-risk function curves for all the variables were generated. Single covariate, Cox regression models were performed for each variable. Wald chi-square tests were then conducted using a probability level of .05 (two-tailed). For the continuous psychological measures, dichotomous cutoff scores were also calculated and single covariate survival analyses were conducted. Specific cutoff scores were empirically chosen to yield the highest hazard ratios.

We conducted multivariate survival analyses to evaluate the unique contribution of each risk factor for estimating eventual suicide while controlling for the effects of other significant risk factors. Variables that were significant in the single covariate models were first entered into one
of four multiple covariate models: a demographic model, a psychiatric history model, a psychological measures model, or a diagnostic model. A final Cox regression model was performed by simultaneously including all of the significant variables from each of these four models that contributed a unique risk for predicting suicide.

Results

There were 49 (1%) suicides and 170 (3%) natural deaths. Table 1 displays the demographic and psychiatric history frequencies for the 49 suicide patients and the 6,842 other patients at the time of the intake evaluation. Individuals who committed suicide (M = 41.1 years, SD = 14.25 years) were significantly older than the other patients (M = 36.3 years, SD = 12.18 years). \( t(6614) = 2.72, p < .05 \). The mean length of time from the intake interview to suicide was 4.07 years (SD = 3.96 years); the range was from 2 weeks to 12 years.

Forty-seven (96%) of the 49 suicide patients had primary, secondary, or tertiary diagnosis of some type of mood disorder. The primary Axis I diagnoses were 34 (69%) major depressive disorder, 7 (14%) bipolar disorder, 6 (12%) dysthmic disorder, 1 (2%) generalized anxiety disorder, and 1 (2%) adjustment disorder with depressed mood. In addition, 6 (12%) of the suicide patients were diagnosed with a secondary alcohol or other substance abuse disorder, and 3 (6%) were diagnosed with secondary panic disorder. There were also 24 (49%) patients who were diagnosed with a personality disorder.

The methods of suicide stated on the death certificates were as follows: 14 (29%) drug overdose, 13 (27%) gunshot wound, 7 (14%) hanging, 5 (10%) drowning, 3 (6%) carbon monoxide inhalation, 3 (6%) asphyxia (encased head in plastic bag), 1 (2%) smoke inhalation (self-initiated fire in residence), 1 (2%) cyanide toxicity, 1 (2%) multiple injuries (jumped from residence), and 1 (2%) exsanguination (self-inflicted jugular vein laceration).

For those patients who did not commit suicide, 4,482 (66%) patients were diagnosed with a mood disorder as a primary, secondary, or tertiary diagnosis. The primary Axis I diagnoses were 2,027 (30%) major depressive disorder, 1,020 (15%) dysthmic disorder, 263 (4%) bipolar disorder, and 225 (3%) depressive disorder not otherwise specified (NOS). Another 559 (8%) patients were diagnosed with panic disorder, 436 (6%) had generalized anxiety disorder, and 171 (2%) received anxiety disorder NOS diagnoses. Finally, 416 (6%) patients had an adjustment disorder, 292 (4%) had some type of phobia, 123 (2%) had obsessive–compulsive disorder, 915 (13%) received other diagnoses, and 395 (6%) had no Axis I diagnosis. In addition, 821 (12%) of the nonsuicide patients were diagnosed with a primary, secondary, or tertiary alcohol or substance abuse disorder. Finally, 2,482 (36%) nonsuicide patients were diagnosed with a personality disorder.

The results indicated that higher levels of suicide ideation, depression, and hopelessness were significant risk factors for suicide using single covariate, proportional hazard models. In contrast, higher levels of anxiety were not significant risk factors (see Table 2). The hazard ratios using cutoff scores for the psychological measures are presented in Table 3. For the BHS, the cutoff score was identical to the one in our previous study (Beck, Brown, Berchick, Stewart, & Steer, 1990). In addition, the positive predictive value (PPV) and negative predictive value (NPV) are reported in Table 3. The PPV is the ratio of the number of true positives to the total number of true and false positives. Conversely, the NPV is the number of true negatives to the total number of true and false negatives. Measures with the highest PPV included clinician-administered measures of suicide ideation and depression.

With respect to psychiatric diagnoses, mood disorder, major depressive disorder, and bipolar disorder were significant risk factors (see Table 2). Specifically, major depressive disorder, recurrent episode, was significant, whereas major depressive disorder, single episode, was not significant. The presence of a personality disorder was a significant risk factor for suicide, whereas diagnoses of panic disorder or substance abuse disorder were not significant risk factors.

Regardless of the psychiatric history variables, previous psychiatric hospitalization, previous suicide attempts, previous pharmacotherapy, and family history of suicide were all significant markers for suicide. In addition, increasing age and unemployment status were significant predictors of suicide, whereas gender and ethnicity were not significant.

When significant variables in Table 2 were entered in one of four multiple covariate models, previous psychotherapy was excluded from the psychiatric history model because this variable was highly confounded with previous pharmacotherapy. The final
Table 2

Risk Factors for Suicide Using Single Covariate Models

<table>
<thead>
<tr>
<th>Variable</th>
<th>Hazard ratio</th>
<th>95% CI</th>
<th>Suicide n</th>
<th>Censored n</th>
<th>χ²</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Psychological measures</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SSI-C total score</td>
<td>1.11</td>
<td>1.07–1.15</td>
<td>44</td>
<td>5,739</td>
<td>35.29</td>
<td>.001</td>
</tr>
<tr>
<td>BHS total score</td>
<td>1.11</td>
<td>1.05–1.17</td>
<td>48</td>
<td>5,422</td>
<td>13.87</td>
<td>.001</td>
</tr>
<tr>
<td>BDI total score</td>
<td>1.06</td>
<td>1.03–1.09</td>
<td>47</td>
<td>5,554</td>
<td>18.87</td>
<td>.001</td>
</tr>
<tr>
<td>HRSD-R total score</td>
<td>1.12</td>
<td>1.07–1.17</td>
<td>42</td>
<td>4,957</td>
<td>21.82</td>
<td>.001</td>
</tr>
<tr>
<td>HARS-R total score</td>
<td>1.00</td>
<td>0.96–1.04</td>
<td>39</td>
<td>5,027</td>
<td>0.01</td>
<td>.952</td>
</tr>
<tr>
<td>BAI total score</td>
<td>1.02</td>
<td>0.99–1.04</td>
<td>42</td>
<td>5,144</td>
<td>1.34</td>
<td>.247</td>
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<td>Psychiatric diagnoses</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Major depressive disorder</td>
<td>3.50</td>
<td>1.88–6.51</td>
<td>48</td>
<td>6,447</td>
<td>15.70</td>
<td>.001</td>
</tr>
<tr>
<td>Recurrent episode</td>
<td>3.20</td>
<td>1.81–5.68</td>
<td>48</td>
<td>6,447</td>
<td>15.88</td>
<td>.001</td>
</tr>
<tr>
<td>Single episode</td>
<td>1.27</td>
<td>0.59–2.71</td>
<td>48</td>
<td>6,447</td>
<td>0.37</td>
<td>.544</td>
</tr>
<tr>
<td>Bipolar disorder</td>
<td>3.71</td>
<td>1.66–8.27</td>
<td>48</td>
<td>6,447</td>
<td>10.27</td>
<td>.001</td>
</tr>
<tr>
<td>Panic disorder</td>
<td>0.58</td>
<td>0.18–1.87</td>
<td>48</td>
<td>6,447</td>
<td>0.84</td>
<td>.361</td>
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<tr>
<td>Substance abuse</td>
<td>1.38</td>
<td>0.58–3.27</td>
<td>48</td>
<td>6,447</td>
<td>0.53</td>
<td>.465</td>
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<tr>
<td>Personality disorder</td>
<td>2.08</td>
<td>1.18–3.65</td>
<td>49</td>
<td>6,842</td>
<td>6.41</td>
<td>.011</td>
</tr>
<tr>
<td>Psychiatric history</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Psychiatric hospitalization</td>
<td>9.30</td>
<td>5.12–16.90</td>
<td>49</td>
<td>5,734</td>
<td>53.56</td>
<td>.001</td>
</tr>
<tr>
<td>Previous suicide attempts</td>
<td>10.24</td>
<td>5.29–19.86</td>
<td>40</td>
<td>4,054</td>
<td>47.47</td>
<td>.001</td>
</tr>
<tr>
<td>Previous pharmacotherapy</td>
<td>10.51</td>
<td>3.27–33.80</td>
<td>49</td>
<td>5,803</td>
<td>15.58</td>
<td>.001</td>
</tr>
<tr>
<td>Previous psychotherapy</td>
<td>14.29</td>
<td>1.97–103.53</td>
<td>49</td>
<td>5,697</td>
<td>6.92</td>
<td>.009</td>
</tr>
<tr>
<td>Suicide in family</td>
<td>2.63</td>
<td>1.23–5.63</td>
<td>47</td>
<td>5,817</td>
<td>6.19</td>
<td>.013</td>
</tr>
<tr>
<td>Demographics</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender*</td>
<td>1.63</td>
<td>0.93–2.87</td>
<td>49</td>
<td>6,835</td>
<td>2.91</td>
<td>.088</td>
</tr>
<tr>
<td>Raceb</td>
<td>1.58</td>
<td>0.57–4.39</td>
<td>49</td>
<td>5,693</td>
<td>0.76</td>
<td>.383</td>
</tr>
<tr>
<td>Age (years)</td>
<td>1.03</td>
<td>1.01–1.05</td>
<td>49</td>
<td>6,567</td>
<td>7.93</td>
<td>.005</td>
</tr>
<tr>
<td>Unemployedc</td>
<td>3.33</td>
<td>1.88–5.91</td>
<td>47</td>
<td>6,011</td>
<td>17.01</td>
<td>.001</td>
</tr>
</tbody>
</table>

Note. CI = confidence interval; SSI-C = Scale for Suicide Ideation (current); BHS = Beck Hopelessness Scale; BDI = Beck Depression Inventory; HRSD-R = Hamilton Psychiatric Rating Scale for Depression (revised); HARS-R = Hamilton Anxiety Rating Scale (revised); BAI = Beck Anxiety Inventory.

* 0 = male, 1 = female.

b 0 = other, 1 = African American.

c 0 = no, 1 = yes.

simultaneous Cox regression model included current suicide ideation, major depressive disorder, bipolar disorder, previous suicide attempts, previous psychiatric hospitalization, unemployment status, and age. The results indicated that all of the variables in the model contributed unique risk estimates of eventual suicide (see Table 4). Of these variables, previous psychiatric hospitalization had the highest hazard ratio.

Finally, we conducted single covariate models using all of the variables, with death from natural causes (other than suicide) as the primary outcome variable (n = 170). These analyses revealed that

Table 3

Risk Factors for Suicide Using Cutoff Scores

<table>
<thead>
<tr>
<th>Psychological measure</th>
<th>Hazard ratio</th>
<th>95% CI</th>
<th>Suicide n</th>
<th>Censored n</th>
<th>χ²</th>
<th>PPV (%)</th>
<th>NPV (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSI-C total score (&gt;2)</td>
<td>6.56</td>
<td>3.61–11.93</td>
<td>44</td>
<td>5,739</td>
<td>38.02</td>
<td>.001</td>
<td>3</td>
</tr>
<tr>
<td>BHS total score (&gt;8)</td>
<td>4.46</td>
<td>2.00–9.94</td>
<td>48</td>
<td>5,422</td>
<td>13.32</td>
<td>.001</td>
<td>1</td>
</tr>
<tr>
<td>BDI total score (&gt;2)</td>
<td>3.55</td>
<td>1.93–6.55</td>
<td>48</td>
<td>5,619</td>
<td>16.53</td>
<td>.001</td>
<td>2</td>
</tr>
<tr>
<td>HRSD-R total score (&gt;18)</td>
<td>3.21</td>
<td>1.73–5.95</td>
<td>42</td>
<td>4,957</td>
<td>13.61</td>
<td>.001</td>
<td>2</td>
</tr>
<tr>
<td>BAI total score (&gt;12)</td>
<td>1.78</td>
<td>0.91–3.50</td>
<td>42</td>
<td>5,144</td>
<td>2.88</td>
<td>.009</td>
<td>1</td>
</tr>
<tr>
<td>HARS-R total score (&gt;12)</td>
<td>1.07</td>
<td>0.57–2.03</td>
<td>39</td>
<td>5,027</td>
<td>0.05</td>
<td>.827</td>
<td>1</td>
</tr>
</tbody>
</table>

Note. Cutoff scores are presented in parentheses. CI = confidence interval; PPV = positive predictive value; NPV = negative predictive value; SSI-C = Scale for Suicide Ideation (current); BHS = Beck Hopelessness Scale; BDI = Beck Depression Inventory; HRSD-R = Hamilton Psychiatric Rating Scale for Depression (revised); BAI = Beck Anxiety Inventory; HARS-R = Hamilton Anxiety Rating Scale (revised).
increasing age, gender (female), unemployment status, and previous hospitalization were significant markers for death from natural causes \((p < .001)\). To a lesser extent, race (African American; \(p < .05\)) and previous pharmacotherapy \((p < .01)\) were also associated with an increased risk of death from other causes. In contrast, psychiatric diagnoses and scores on the psychological measures were not significant risk factors for death from natural causes.

### Discussion

The present study found that current suicide ideation, major depressive disorder, bipolar disorder, and unemployment status contributed unique risk estimates of eventual suicide. In addition, previous suicide attempts, previous psychiatric hospitalization, and increasing age were unique markers for suicide. In contrast, none of the psychological variables were a significant risk factor for death from natural causes. Although many of these variables may be significant predictors of suicide, only potentially modifiable factors that concern the patient's psychiatric status are important for implementing strategies for suicide prevention.

Addressing each variable individually, we found that current suicide ideation was a risk factor in the present study as well as in previous research with psychiatric patients\(^1\) (e.g., Goldstein, Black, Nasrallah, & Winokur, 1991). Those patients who scored a 3 or higher on the SSI-C were approximately seven times more likely to commit suicide than those who scored less than 3. Although suicide ideation is a criterion for a major depressive episode in the *DSM-IV* (American Psychiatric Association, 1994), the presence of suicidal thinking provides an independent estimate of the risk for suicide.

As with suicide ideation, the results of the present study are consistent with previous prospective studies that have identified hopelessness as an important risk factor for suicide (for a review, see Glanz, Haas, & Sweeney, 1995). Patients who scored a 9 or above on the BHS were approximately four times more likely than patients who scored 8 or below to commit suicide within a given year of follow-up. These results are particularly interesting because hopelessness is a set of beliefs that can be specifically addressed and modified through treatment. In fact, recent research has indicated that patients whose hopelessness does not significantly change with psychiatric treatment may be more likely to commit suicide (Dahlsgaard, Beck, & Brown, 1998). Previous research has also indicated that stable levels of hopelessness in patients with remitted depression is more predictive of suicide attempts than high levels at any one point (Young et al., 1996).

The finding that major depressive disorder and bipolar disorder emerged as significant risk factors for suicide is consistent with previous research with psychiatric patients (e.g., Fawcett et al., 1990). Interestingly, a diagnosis of recurrent major depressive disorder was a significant risk factor, whereas major depressive disorder with a single episode specifier was not a significant risk factor. This finding suggests that the chronicity of a psychiatric disorder may be important for estimating the risk for suicide.

Several diagnostic variables did not emerge as significant predictors in the present study. The diagnosis of substance abuse or dependence was not identified as a risk factor for suicide in this study, although previous research has indicated that substance abuse or dependence (e.g., Goldstein et al., 1991) may be associated with suicide. This lack of support for substance abuse as a risk factor may be attributable to the low number of patients with a substance abuse diagnosis evaluated at the CCT. These potential patients were typically referred to a rehabilitation facility for alcohol or drug abuse prior to obtaining an evaluation. Similarly, the diagnosis of schizophrenia did not emerge as a significant risk factor, even though previous studies have found that approximately 10% of these patients eventually commit suicide (Roy, 1986). In our sample, potential participants were screened for this disorder and referred to other treatment facilities prior to the intake evaluation.

Although the diagnosis of a personality disorder was found to be a risk factor for suicide, which is consistent with other studies (e.g., Black & Winokur, 1986), it failed to provide a unique

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\(^1\) The odds ratios for the SSI-C and the BHS for a proportion of this sample \((n = 3,701, \text{including} \text{ 30 suicide patients})\) have been previously reported (Beck, Brown, Steer, Dahlsgaard, & Grisham, 1999). In addition, the odds ratios for the BHS for a proportion of this sample \((n = 1,958, \text{including} \text{ 17 suicide patients})\) have been previously published (Beck et al., 1990). The present study reports the individual hazard ratios for the SSI-C and the BHS that are based, in part, on 3,190 additional participants (including 19 suicide patients) whose data were combined with the data from the previous study (Beck et al., 1999). Unlike the previous studies, however, this study controlled for censoring effects that are due to the differential length of follow-up, as well as for the effects of other risk factors, using multivariate survival analyses.
contribution to the prediction of suicide when controlling for the risk associated with mood disorders.

With respect to psychiatric history variables, the findings of the present study are in agreement with other prospective studies that have found previous suicide attempts (e.g., Nordström et al., 1995) or previous psychiatric hospitalization (Motto, Heilbron, & Juster, 1985) to be significant risk factors for suicide. This emphasizes the importance of obtaining a thorough psychiatric history for the purpose of evaluating risk for suicide (Maris et al., 1992).

The results also indicated that unemployment status was a significant risk factor for suicide. This finding suggests the value of assisting unemployed patients with their job searches. In addition, adults over the age of 48 were found to have a higher risk of suicide than younger adults. Although few prospective studies with psychiatric patients have reported that age is a risk factor for suicide (e.g., Motto et al., 1985), a recent retrospective study also found that the risk for suicide increases with age (Conwell et al., 1996).

Several important findings emerged from our study that are in contrast to the risk factors that have been reported in epidemiological studies based on the general population. For example, the present study did not find that gender was a risk factor despite the finding that more men than women commit suicide in the general population (Hoyert et al., 1999). Interestingly, only 27% of the suicides in our sample were the result of gunshot wounds (the leading method of suicide was by overdose). In contrast, 59% of the suicides in the general population were firearm related (Hoyert et al., 1999).

Although the results of the present study have implications for the importance of evaluating multiple risk factors in outpatient psychiatric populations using standardized measures, the prediction of suicide for individuals remains problematic because of the low base rate for this behavior in general outpatient psychiatric samples. For example, the highest PPV (the proportion of those patients who tested positive and who committed suicide) was less than 5% for those patients who had previously attempted suicide. As Pokorny (1993) has demonstrated, the individual prediction of suicide improves when using multivariate models with a higher base rate of suicide. Despite the low PPV of individual risk factors, the present study suggests specific cutoff scores for standardized assessment measures that may be useful for identifying high-risk populations.

Several potential sampling biases should be noted. Because the present sample was predominantly composed of educated Whites, caution should be used in generalizing the conclusions of this study to other outpatient populations. Future prospective suicide research should attempt to recruit more minorities and populations of varying education levels.

A methodological limitation of this study, as well as other studies, is the possibility of the underreporting of suicide deaths (Lester, 1997). Although there is no clear consensus of the extent to which misclassification of the cause of death influences the conclusions from published research, medical examiners may be less likely to classify a death as a suicide if the victim used alcohol (Jarvis, Boldt, & Butt, 1991).

Future prospective studies using standardized assessment measures are necessary to ascertain whether the present findings are generalizable to other outpatient settings (e.g., general psychiatric clinics, substance abuse treatment facilities, and primary care practices). Moreover, future randomized clinical trials that investigate treatment for psychiatric disorders or suicide-related behaviors are needed for evaluating the differential effects of treatment on completed suicide.

References


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