Prevalence of and Risk Factors for Lifetime Suicide Attempts in the National Comorbidity Survey

Ronald C. Kessler, PhD; Guilherme Borges, ScD; Ellen E. Walters, MS

Background: General population survey data are presented on the lifetime prevalence of suicide attempts as well as transition probabilities to onset of ideation, plans among ideators, and attempts among ideators either with or without a plan. Risk factors for these transitions are also studied.

Methods: Data are from part II of the National Comorbidity Survey, a nationally representative survey carried out from 1990 to 1992 in a sample of 5877 respondents aged 15 to 54 years to study prevalences and correlates of DSM-III-R disorders. Transitions are estimated using life-table analysis. Risk factors are examined using survival analysis.

Results: Of the respondents, 13.5% reported lifetime ideation, 3.9% a plan, and 4.6% an attempt. Cumulative probabilities were 34% for the transition from ideation to a plan, 72% from a plan to an attempt, and 26% from ideation to an unplanned attempt. About 90% of unplanned and 60% of planned first attempts occurred within 1 year of the onset of ideation. All significant risk factors (female, previously married, age less than 25 years, in a recent cohort, poorly educated, and having 1 or more of the DSM-III-R disorders assessed in the survey) were more strongly related to ideation than to progression from ideation to a plan or an attempt.

Conclusions: Prevention efforts should focus on planned attempts because of the rapid onset and unpredictability of unplanned attempts. More research is needed on the determinants of unplanned attempts.

Arch Gen Psychiatry. 1999;56:617-626

This report presents nationally representative data on the prevalence and risk factors of attempted suicide in the National Comorbidity Survey (NCS).1 The motivations are that attempted suicide is both one of the strongest risk factors for completed suicide2-4 and an important indicator of extreme emotional distress.5,6 Previous epidemiologic studies in the United States have estimated that between 1.1%7 and 4.3%8 of the population attempt suicide at some time in their life. However, no previous epidemiologic survey has investigated either trends in prevalence across cohorts or conditional risk of attempts in relation to the prior onset of ideation and plans or in relation to intercohort differences; these are a focus of the current report. This report also examines sociodemographic variables and DSM-III-R disorders as risk factors for attempted suicide. Previous research has documented that some demographic variables are risk factors for attempted suicide, including age,8,10 sex (reviewed by Moscicki11), marital status,12,13 education,8,13,14 race,13,15,16 and childbearing.17 In addition, several studies of adults14,18,19 and youth20,21 have examined the parallel effects of demographic variables on both ideation and attempts. However, no previous study has disaggregated these effects into influences on ideation, the transition from ideation to a plan, and the transition from ideation to an attempt either in the presence or absence of a plan. As shown below, insights gleaned from this disaggregation have useful implications for targeting preventive interventions.

RESULTS

PREVALENCE

The estimated lifetime prevalences (SEs) of suicide ideation, plans, and attempts in the NCS are 13.5% (0.6), 3.9% (0.4), and 4.6% (0.4), respectively. Attempters were presented with 3 statements describing the lethality of their attempt. Of the attempters, 39.3% (3.5) endorsed the statement that they made a serious attempt, and it was only because of luck that they did not die; while 13.3% (2.1) endorsed the statement that they were serious, but knew the method was not foolproof; and the remaining 47.3% (3.9) endorsed the statement that their attempt was a cry for help, and they did not want to die.

The conditional probability of ever making a plan among lifetime ideators was...
SUBJECTS AND METHODS

SAMPLE

The NCS was based on a nationally representative population survey of 8098 persons aged 15 to 54 years carried out from 1990 through 1992. Informed consent was obtained from all respondents and also from parents of minors. The response rate was 82.4%. All 8098 respondents were administered the part I interview, which averaged somewhat more than 1 hour to complete and included the assessment of DSM-III-R disorders. All respondents who screened positive for a lifetime prevalence of any disorder and a random subsample of other respondents were administered the part II interview. The part II interview averaged slightly more than 1 hour and consisted largely of questions about risk factors and consequences of the disorders assessed in part I. The suicidality questions were included in the part II interview. As a result, the present report is based on the 5877 respondents who participated in the part II interview. The data for these respondents were weighted to correct for differential probabilities of selection into part II as well as for differential probabilities of within-household selection and nonresponse. Comparisons of the part II NCS demographic distributions with census data show that the sample is representative of the US population on a wide range of sociodemographic variables. More details about the NCS design and data collection methods are reported elsewhere.1,24

MEASURES

The questions about suicide ideation, plans, and attempts are part of the life-event history section of the NCS interview. Separate questions were asked about the lifetime occurrence of suicide ideation (“Have you ever seriously thought about committing suicide?”), suicide plans (“Have you ever made a plan for committing suicide?”), and suicide attempts (“Have you ever attempted suicide?”). For each of these outcomes, information was obtained about age at first occurrence and the recency of occurrence. Lethality of intent was assessed by reading 3 statements and asking attempters to select 1 of the 3 to describe their first attempt. The first statement was “I made a serious attempt to kill myself and it was only luck that I did not succeed.” The second statement was “I tried to kill myself, but I knew the method was not foolproof.” The third statement was “My attempt was a cry for help; I did not want to die.”

The sociodemographic variables included in the analysis are sex, marital status, cohort, educational attainment, age of youngest child, race/ethnicity, and urbanicity. Marital status was coded to differentiate the currently married, previously married (separated, divorced, widowed), and never married. Cohort was coded to differentiate respondents born in the decades 1936 to 1945, 1946 to 1955, 1956 to 1965, and 1966 to 1975. Educational attainment was coded to differentiate current students from those who had completed their schooling and, within each of these 2 categories, to differentiate those who had completed less than high school, high school, some college, or college graduation or more. Age of the respondents’ youngest child was coded into 4 categories consisting of respondents who had no living child and those whose youngest child was age 1 year, between ages 2 and 10 years, and more than age 10 years. Race/ethnicity was coded to differentiate among non-Hispanic whites, non-Hispanic blacks, Hispanics, and all others (Native Americans, Asians, Pacific Islanders, and respondents who self-defined themselves as “other”). Finally, urbanicity was coded to differentiate respondents living in census-defined major metropolitan areas from those living in other census-defined urbanized areas or in census-defined nonurban areas.

DSM-III-R diagnoses were generated from a modified version of the Composite International Diagnostic Interview (CIDI),25 a fully structured interview designed to be used by trained interviewers who are not clinicians. World Health Organization Field Trials26 and NCS clinical reappraisal studies27 both document good reliability and validity of most CIDI diagnoses, including mood disorders (major depression and dysthymia), anxiety disorders (panic disorder, generalized anxiety disorder, phobias, and posttraumatic stress disorder), and substance use disorders (alcohol abuse and dependence and drug abuse and dependence). However, there are 2 important exceptions involving mania28 and nonaffective psychosis,29 neither of which is assessed with adequate validity in the CIDI. Because of these problems, a restricted definition of mania (euphoric-granidose subtype) and clinical diagnoses of nonaffective psychosis were used rather than the CIDI diagnoses in the analyses reported here. Conduct Disorder, Adult Antisocial Behavior, and Antisocial Personality Disorder (the conjunction of Conduct Disorder and Adult Antisocial Behavior) were assessed with the Diagnostic Interview Schedule30 since these disorders are not included in the CIDI.

ANALYSIS PROCEDURES

All analyses were carried out using the SAS31 software package (SAS Inc, Cary, NC). Simple cross-tabulations were used to investigate the associations among suicide ideation, plans, and attempts. Life-table methods were used to examine age-of-onset distributions. A discrete-time survival analysis with time-varying covariates32 was used to study the risk factors of lifetime suicide ideation, plans, and attempts. The use of this method in the NCS has been described in detail previously.33 Retrospective reports were used in the survival analyses to create the time-varying risk factors (eg, ages of changes in marital status) and to date the ages of onset of the outcome variables.

Because of the complex sample design and weighting of the NCS, SEs of the survival coefficients were estimated using the Jackknife Repeated Replications34 simulation method implemented in an SAS macro. The Jackknife Repeated Replications estimates adjust for the clustering and weighting of cases. The survival coefficients were exponentiated and are reported below in the form of odds ratios (ORs). The 95% confidence intervals (CIs) of these coefficients are also reported and have been adjusted for design effects. Multivariate tests are based on χ2 values computed from coefficient variance-covariance matrices that were adjusted for design effects using Jackknife Repeated Replications. When a result is specified as being significant below, it is referring to statistical significance based on 2-sided design-based tests evaluated at the .05 level.
28.9% (2.3), while the conditional probabilities of making an attempt (ignoring lethality of intent) among ideators were 57.9% (3.9) with a plan and 25.2% (1.9) without a plan. Among attempters, 46.7% (3.7) reported that they had a plan prior to making their first attempt.

**ONSET DISTRIBUTIONS**

Hazard curves (Figure 1) show that the highest risks of initial suicide ideation, plans, and attempts (ignoring lethality of intent) are in the late teens and early 20s. Age-of-onset curves (Figure 2) show that median ages of onset for all these outcomes are in the mid-20s. Conditional age-of-onset curves (Figure 3) show that progression from ideation to first onset of a plan, from a plan to first attempt, and from ideation to first attempt in the absence of a plan were all highest in the first year after onset of the earlier stage.

Two additional important results can be seen by comparing the curves for planned and unplanned attempts. One is that risk of a first attempt among ideators was substantially higher in the presence of a plan. The other is that risk of a first attempt among ideators who lack a plan was largely limited to the first year after onset of ideation. In comparison, risk of an attempt among ideators with a plan not only was very high in the year of onset of the plan, but also continued for many years afterward. In all, roughly 90% of unplanned attempts and 60% of planned attempts occurred within 1 year of the onset of ideation. Lethality of intent among attempters was not significantly related either to the presence of a plan ($\chi^2_1 = 1.0; P = .31$) or to speed of the attempt after onset of ideation ($\chi^2_1 = 1.2; P = .28$).

**SOCIODEMOGRAPHIC RISK FACTORS**

Risk of an attempt was significantly related to being female, being previously married, being born in a recent cohort, and having a low educational level (Table 1). The odds of an attempt were also lower among students than among nonstudents at the same level of educational attainment. Although non-Hispanic blacks had significantly lower odds of attempted suicide than non-Hispanic whites, the 4-category race/ethnicity variable was not significantly related to attempted suicide overall ($\chi^2_3 = 7.0; P = .07$).

The higher odds of an attempt among women than among men was related to 3 significant pathways, all with roughly equal ORs (1.5-1.8): higher unconditional odds of initial ideation, higher conditional odds of an attempt among ideators with a plan, and higher conditional odds of an attempt among ideators without a plan. There was no significant sex difference among ideators in the odds of making a plan. Interaction between sex and cohort in predicting attempts was also tested based on a suggestion that the sex difference might be smaller in recent cohorts. No significant interaction was found ($\chi^2_3 = 5.0; P = .17$).

The higher odds of an attempt among previously married subjects than among currently married subjects was related to 2 of these same 3 pathways, again with roughly equal ORs (2.2): higher unconditional odds of initial ideation and higher conditional odds of an attempt among ideators with a plan. However, the second variable was not statistically significant. Unmarried ideators were not more likely than their married counterparts either to make a plan subsequent to the onset of
interaction or to make an attempt in the absence of a plan. Interaction between marital status and age (coded as a dichotomy for age 18 years or younger vs age 19 years or older) was also tested based on the finding in previous research that the protective effect of marriage is less strong or even reverses at early age.\textsuperscript{12} No significant interaction was found ($\chi^2 = 0.8; P = .39$).

The higher odds of an attempt in more recent cohorts than in earlier cohorts was related to somewhat different pathways. First, there was a significant increase across cohorts, especially strong for the most recent cohort (OR = 6.4), in the unconditional odds of ideation. Second, there was a significant but less strong increase in the conditional odds of making a plan among ideators that was very similar across all cohorts born after World War II (OR = 1.6-3.2). Third, there was a significant intercohort difference in the conditional odds of an attempt among ideators in the absence of a plan ($\chi^2 = 9.6; P = .02$). There were no significant intercohort differences in the conditional odds of an attempt among ideators in the presence of a plan ($\chi^2 = 3.0; P = .39$).

The significant negative association between education and the odds of an attempt was related to pathways: a modest association with unconditional risk of ideation (OR = 1.3-2.3), a stronger association with the transition from having a plan to making an attempt (OR = 2.9-7.0), and an even stronger association with making an attempt among ideators in the absence of a plan (OR = 8.0-29.3). There was no significant association between education and the conditional odds of making a plan among ideators.

An effort was made to study the predictors of lethality of the attempt among attempters. However, the number of attempters in the NCS was too small to detect meaningful predictors with acceptable statistical power. It is of special note that neither age of first attempt ($\chi^2 = 3.2; P = .52$) nor cohort ($\chi^2 = 5.2; P = .15$) was found to be a significant predictor of lethality, although caution is needed in interpreting these negative results because of their low statistical power.

**PRIOR DSM-III-R DISORDERS AS RISK FACTORS**

Every one of the DSM-III-R disorders assessed in the NCS was a significant risk factor for a lifetime attempt (Table 2). However, the ORs for mood disorders (7.8-29.7) were substantially higher than those for any other disorders (2.1-6.5). As thoughts of death are included among the symptoms of major depression, thus creating the possibility of a confounding effect in predicting the outcomes, the analysis was also replicated with a modified definition of major depression that excluded this criterion. The OR increased from 11.0 (95% CI: 7.1-20.3) in Table 2 to 12.1 (95% CI: 9.3-15.6). Significance of variation in the effects of aggregate measures of disorders (any mood disorder, any anxiety disorder, any substance disorder, and any other disorder) as a function of both age (dichotomized at the median age of first attempt) and cohort was also tested. No significant interactions were found either with age ($\chi^2 = 5.8; P = .21$) or with cohort ($\chi^2 = 14.1; P = .29$). In comparison, 4 significant interactions involved sex: major depression ($\chi^2 = 8.1; P = .004$), dysthymia ($\chi^2 = 4.5; P = .03$), any mood disorder ($\chi^2 = 6.7; P = .01$), and simple phobia ($\chi^2 = 8.5; P = .003$). The effect of the disorder was larger among men than among women in all 4 interactions.
An attempt was also made to evaluate the effects of comorbidity among disorders in predicting the outcomes. As shown in the last 4 rows of Table 2, there was a significant dose-response relationship between number of prior disorders and odds of attempted suicide. Respondents with 3 or more disorders had relative odds of an attempt 19.7 times as high as respondents with no disorder. However, this result does not control for the main effects of individual disorders. When an equation was estimated that included information about each of the individual disorders as separate predictors, the incremental effect of comorbidity was found to be considerably smaller, although still statistically significant in predicting attempts, with ORs of 3.2 (95% CI: 2.0-5.2) for exactly 2 disorders and 4.1 (95% CI: 2.0-8.3) for 3 or more disorders. No significant effects of particular bivariate or multivariate comorbidity were found after controlling for number of disorders.

Three broad patterns are noteworthy in the pathways of the significant associations of prior disorders with first suicide attempts. First, there were consistently significant ORs between all of the disorders and the subsequent first onset of suicide ideation. These ORs were much higher for the mood disorders (7.7-15.5) than for any other disorders (2.2-5.3) and, within disorder, higher in predicting ideation than any other pathway for every one of the disorders. Second, the pathways associated with the conditional odds of developing a plan among ideators and of making an attempt among ideators without a plan were consistently greater than 1.0. Furthermore, ORs were roughly equal in magnitude both when compared across disorders for a particular pathway and when compared within disorders across pathways. Most of these ORs were in the range of 1.5 to 3.0. The same patterns applied to the effects of comorbidity. It is noteworthy that the much higher ORs associated with mood disorders found in other parts of the table were not found here, with the exception of strong ORs for mania with the subsequent occurrence of a plan (OR = 4.0) and an unplanned attempt (OR = 9.1). Third, the pathway associated with the conditional odds of making an attempt among ideators with a plan was generally not significant. The only exceptions were the mood disorders (OR = 1.8-3.2), panic disorder (OR = 2.0), and drug abuse (OR = 1.3).

As noted above, the sample of attempters was too small to study the predictors of lethality of the attempt with good statistical power. However, exploratory analysis shows that seriousness of attempt was positively related to total number of disorders ($\chi^2_{15} = 34.2, P = .003$), although no particular type of disorder stands out as significantly more important than any other in the analysis of this small subsample of respondents.

**COMBINING THE RISK FACTORS**

Further analysis shows that the disorders considered in Table 2 partially explain the effects of the sociodemographic variables considered in Table 1. This was evaluated in a joint model to predict attempted suicide in the total sample. Results show that the significant effects of sex, cohort, and education were attenuated but remained significant when controlling for disorders. The $\chi^2$ values for the individual predictors decreased from 34.7
to 22.7 (P < .001) for sex, from 92.0 to 33.6 (P < .001) for cohort, and from 56.7 to 29.4 (P < .001) for education. In comparison, the significant effect of marital status and near-significant effect of race/ethnicity in Table 1 are largely explained by mental disorders, with the χ² values changing from 11.7 to 4.6 (P = .10) for marital status and from 7.0 to 1.5 (P = .22) for race/ethnicity.

Survival analysis for all possible subsets was used to develop a parsimonious risk factor equation for first attempts based on the results of these multivariate models. The final equation included terms for age 15 to 24 years, female, most recent cohort, nonstudents with 12 or fewer years of education, any mood disorder, nonaffective psychosis, posttraumatic stress disorder, any substance disorder, and antisocial personality disorder. There was a dramatic dose-response relationship between number of risk factors and relative odds of first suicide attempt (Table 3). Inspection of the disaggregated coefficients in Table 3 shows, similar to Table 2, that the highest ORs were associated with the unconditional odds of onset of initial suicide ideation and the lowest ORs were associated with the conditional odds of a first attempt among ideators with a plan.

### Table 1. Multivariate Associations of Sociodemographic Predictors With First Onset of Attempted Suicide in the Total Sample and Disaggregated Through Pathways Involving Onset of Ideation, Plans, Impulsive Attempts, and Planned Attempts*

<table>
<thead>
<tr>
<th></th>
<th>Total Sample, OR (95% CI)</th>
<th>OR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Attempt (n = 272)</td>
<td>Ideation (n = 795)</td>
</tr>
<tr>
<td><strong>Sex</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Female</td>
<td>2.2 (1.7-2.8)†</td>
<td>1.7 (1.2-2.4)†</td>
</tr>
<tr>
<td>χ²/IP</td>
<td>34.7/.001</td>
<td>28.2/.001</td>
</tr>
<tr>
<td><strong>Marital status</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Previously married</td>
<td>2.6 (1.5-4.6)†</td>
<td>2.3 (1.7-3.0)†</td>
</tr>
<tr>
<td>Never married</td>
<td>1.2 (0.8-2.0)</td>
<td>1.4 (1.0-2.9)†</td>
</tr>
<tr>
<td>χ²/IP</td>
<td>11.7/.003</td>
<td>23.3/.001</td>
</tr>
<tr>
<td><strong>Cohort (year of birth)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1966-1975</td>
<td>6.0 (3.9-9.2)†</td>
<td>6.4 (5.0-8.3)†</td>
</tr>
<tr>
<td>1956-1965</td>
<td>2.2 (1.3-3.5)†</td>
<td>2.2 (1.6-3.0)†</td>
</tr>
<tr>
<td>1946-1955</td>
<td>1.7 (0.9-3.1)</td>
<td>2.0 (1.4-2.7)†</td>
</tr>
<tr>
<td>1936-1945</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>χ²/IP</td>
<td>92.0/.001</td>
<td>352.0/.001</td>
</tr>
<tr>
<td><strong>Education status/y</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student/&lt;12</td>
<td>6.2 (2.3-16.7)†</td>
<td>2.3 (1.0-5.3)†</td>
</tr>
<tr>
<td>Student/12+</td>
<td>3.2 (1.4-7.2)†</td>
<td>1.4 (0.8-2.4)</td>
</tr>
<tr>
<td>Nonstudent/&lt;12</td>
<td>10.6 (5.2-21.3)†</td>
<td>2.1 (0.3-16.3)</td>
</tr>
<tr>
<td>Nonstudent/12</td>
<td>4.8 (2.4-10.0)†</td>
<td>1.6 (1.1-24.2)</td>
</tr>
<tr>
<td>Nonstudent/13-15</td>
<td>4.0 (1.8-8.6)†</td>
<td>1.3 (0.7-2.2)†</td>
</tr>
<tr>
<td>Nonstudent/16+</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>χ²/IP</td>
<td>56.7/.001</td>
<td>18.7/.002</td>
</tr>
<tr>
<td><strong>Age of youngest child, y</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>1-10</td>
<td>0.8 (0.2-4.1)</td>
<td>1.2 (0.7-2.1)</td>
</tr>
<tr>
<td>≥11</td>
<td>1.2 (0.4-3.9)</td>
<td>1.3 (0.9-2.0)</td>
</tr>
<tr>
<td>χ²/IP</td>
<td>2.2/.04</td>
<td>3.9/.07</td>
</tr>
<tr>
<td><strong>Race/ethnicity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Hispanic white</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Non-Hispanic black</td>
<td>0.6 (0.4-0.9)†</td>
<td>0.7 (0.4-1.2)</td>
</tr>
<tr>
<td>Hispanic</td>
<td>1.2 (0.7-1.9)</td>
<td>0.9 (0.6-1.4)</td>
</tr>
<tr>
<td>Other</td>
<td>1.0 (0.5-2.3)</td>
<td>0.8 (0.5-1.4)</td>
</tr>
<tr>
<td>χ²/IP</td>
<td>7.0/.07</td>
<td>5.9/.12</td>
</tr>
<tr>
<td><strong>Urbanicity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Metropolitan</td>
<td>1.2 (0.7-2.1)</td>
<td>1.2 (0.9-1.6)</td>
</tr>
<tr>
<td>Other urban</td>
<td>0.9 (0.2-3.4)</td>
<td>0.9 (0.7-1.2)</td>
</tr>
<tr>
<td>Rural</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>χ²/IP</td>
<td>3.5/.07</td>
<td>6.4/.04</td>
</tr>
<tr>
<td><strong>Total model</strong></td>
<td>823.0/.001</td>
<td>837.5/.001</td>
</tr>
</tbody>
</table>

* Odds ratios (ORs) were obtained by exponentiating coefficients from discrete-time survival models. The 95% confidence intervals (CIs) were obtained using the method of Jackknife Repeated Replications to adjust for clustering and weighting of data. A single model was estimated for each of the 5 outcomes that included all the predictors and controls for person-year. Wald χ² values were obtained from design-based variance-covariance coefficient matrices that adjust for clustering and weighting of the data.

†P < .05 by 2-sided test.
who made a lifetime suicide attempt. 9.2% of the population, accounted for 55.1% of all people.

Furthermore, no reliability or validity data were obtained on the measures of ideation, plans, attempts, or lethality. Finally, the ability to study the distribution and predictors of lethality is constrained by the fact that the sample excluded people who completed suicide. This selection bias might account for the failure to find a significant positive association between age of first attempt and lethality of intent, an association that has been found when both attempters who died and those who survived have been considered in the same analysis.

Within the context of these limitations, the 4.6% estimated lifetime prevalence of attempted suicide is above the high end of the range of estimates reported in previous US general population surveys. Also, the 13.5% estimated prevalence of suicide ideation is at the high end of the range of estimates reported in previous US general population surveys. However, the question wording to assess ideation varied in important ways in earlier surveys, sometimes asking about “thoughts” of suicide, sometimes asking about “serious” thoughts, and “serious thoughts” related to these risk factors.

Table 2. Multivariate Associations of National Comorbidity Survey/DSM-III-R Disorders With Subsequent First Onset of Attempted Suicide in the Total Sample and Disaggregated Through Pathways Involving Onset of Ideation, Plans, Impulsive Attempts, and Planned Attempts

<table>
<thead>
<tr>
<th>Total Sample, OR (95% CI)</th>
<th>Plan Among Ideators (n = 230)</th>
<th>Impulsive Attempt Among Ideators Without a Plan (n = 145)</th>
<th>Planned Attempt Among Ideators With a Plan (n = 127)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attempt (n = 272)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ideation (n = 795)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Mood disorders
- Major depressive episode
- Dysthymia
- Mania
- Any mood disorder

Anxiety disorders
- Generalized anxiety disorder
- Agoraphobia
- Simple phobia
- Social phobia
- Panic disorder
- Posttraumatic stress disorder
- Any anxiety

Substance disorders
- Alcohol abuse
- Alcohol dependence
- Drug abuse
- Drug dependence
- Any substance disorder

Other disorders
- Conduct disorder
- Adult antisocial behavior
- Antisocial personality disorder
- Nonaffective psychosis

No. of total disorders
- Any
- 1
- 2
- ≥3

*Odds ratios (ORs) were obtained by exponentiating coefficients from discrete-time survival models. Disorders were defined without diagnostic hierarchy rules. The 95% confidence intervals (CIs) were obtained using the method of Jackknife Repeated Replications to adjust for clustering and weighting of data. Each column contains (a) exactly 1 of the 17 individual disorders, (b) exactly 1 of the 3 summary measures (any mood, any anxiety, any substance), (c) a single dichotomous measure that distinguishes between respondents with any disorders and those with no disorders, or (d) the set of summary measures of number of disorders (exactly 1, exactly 2, and 3 or more).

†P<.05 by 2-sided test.

Inspection of the distribution of the summary risk factor count in the sample of person-years used in the survival analysis (Table 4) shows that the extremely high OR of a suicide attempt associated with having 5 or more risk factors accounts for only 7.0% of the people who made a lifetime attempt. This is because only a tiny fraction of the population (0.4%) had this large number of risk factors. People with 5 or more risk factors, who made up 0.4% of the population, accounted for 55.1% of all people who made a lifetime suicide attempt. The results reported here are limited by the fact that the NCS is a cross-sectional survey in which information about lifetime suicide behaviors is based on retrospective reports. Because of this limitation, prevalences are likely to be lower bound estimates. The estimated effects of cohort and other risk factors could be caused, at least in part, by systematic differences in accuracy of recall related to these risk factors. Furthermore, no reliability or validity data were obtained on the measures of ideation, plans, attempts, or lethality.
or plans,38 making it difficult to make direct comparisons with the NCS findings.

There is no basis for comparing the 3.9% estimate of lifetime plans obtained in the NCS, as, to our knowledge, no previous population surveys assessed plans separate from thoughts. The finding that risk of an attempt was significantly higher among ideators with than without a plan is consistent with previous studies of period prevalence.9,41 The finding that having a plan was unrelated to lethality of intent among attempters is inconsistent with the finding in one previous study that planned suicide attempts were generally more serious than unplanned attempts.12

Although, to our knowledge, no previous general population surveys estimated the age-of-onset distribution of attempted suicide, related research carried out with students confirms the NCS finding that risk begins to rise during the teenage years.32 This is also consistent with the finding in cross-sectional surveys of adults that period prevalence of attempted suicide is inversely related to age,8 and in longitudinal research that period prevalence decreases as a cohort moves into adulthood.7 The NCS finding of rapid transition from first onset of suicide ideation and plans to attempts cannot be compared with previous research, as no other population surveys have examined this issue.

The risk factors considered here were examined in a survival framework to study the predictors of first attempts. Previous research has generally studied cross-sectional associations between current measures of risk factors and lifetime measures of attempts. This difference in methods could lead to discrepancies in results. Therefore, it is striking that most of the NCS risk factor results are consistent with those found in previous research. These include the higher lifetime prevalence of attempted suicide among women than among men,11 the higher prevalence among previously married people,13 and the inverse association with education,8 although the education association was stronger in the NCS than in other recent studies.13,14 The significantly lower odds of an attempt among non-Hispanic blacks than among whites is consistent with the trend in previous studies (reviewed by Moscicki15), although some studies did not find a race difference.13,16 The analysis fails to replicate the finding of a decrease in the sex difference over recent cohorts35 or the finding that the protective effect of being married is reversed among very young people.12

The NCS provides the first nationally representative general population data on intercohort difference in lifetime suicide attempts. This finding is consistent with independent evidence that could not be explained by a methodological artifact, including increasing prevalences of completed suicide in the United States45 and elsewhere46 in recent cohorts and increasing prevalences of attempted suicide among young people in clinical settings.55-57 To our knowledge, there is no previous research to compare with the findings reported here of significant effects of urbanicity or age of youngest child. The finding that a substantial part of this cohort effect is explained by controlling for disorders means that increasing prevalences of mental disorders in recent cohorts account for most but not all of the cohort effect in suicide attempts.
The strong associations of DSM-III-R disorders with subsequent attempted suicide and the dose-response relationship between the number of these disorders and attempts are consistent with other cross-sectional and longitudinal community epidemiologic surveys. The finding that mood disorders are stronger predictors than other mental or substance use disorders is also consistent with earlier studies. The NCS results do not confirm the findings in some earlier studies, however, of especially strong effects of substance use disorders, antisocial personality disorder, or panic disorder. Stronger associations might have been obtained if the analysis had examined the effects of critical symptoms, such as hopelessness, rather than exclusively focusing on diagnoses.

The finding that comorbidity is a significant predictor of suicide attempts over and above the effects of individual disorders is consistent with many recent studies among both children and adults. While some of these earlier reports suggest a special role of particular types of comorbidity, none of them controlled rigorously for both specific individual disorders and global patterns of comorbidity (ie, number of disorders). When such controls were introduced, no special effects of comorbidity involving particular disorders were found. Total number of disorders, rather than the types of disorders involved in the comorbidity, were found to be the strongest predictors of suicide attempts.

The finding that comorbidity is a significant predictor of lethality is also important and is an exception to the more general failure to document significant predictors of lethality of intent among attempters in the NCS. This failure is inconsistent with findings from previous studies that have documented several significant predictors of lethality, including having a plan and late age of first attempt, that were found to be significant in the NCS. As noted above, the low statistical power to study lethality of intent in the NCS, coupled with the fact that suicide completers were excluded from the analysis, might account for the failure to replicate these previous findings regarding significant predictors of lethality.

The findings that rapid-onset attempts account for more than 90% of unplanned first attempts and approximately two thirds of planned first attempts are in need of replication in both clinical samples and general population samples before they can be accepted. If confirmed, the finding that the vast majority of unplanned first attempts occur shortly after the onset of suicide ideation indicates that efforts to intervene after the onset of ideation to prevent a first unplanned attempt would be impractical unless a patient presented for treatment within a year of first onset of ideation. In cases in which this occurs, the obvious implications are that the clinician should search for modifiable risk factors (eg, depression) and should engage in especially aggressive treatment over the high-risk period of the first year. As noted by Brent, it is also important to make sure patients at risk of impulsive attempts do not have access to medications that can be used to make a suicide attempt, as risk of unplanned attempts may be increased by easy access to such agents.

The only potentially realistic high-risk population prevention efforts aimed at first suicide attempts after the first year of ideation would deal with planned attempts. The retrospective NCS results suggest that approximately one half of the people in the general population with a history of a suicide plan who do not make an attempt during their first year of ideation make an attempt at some later date. The combination of high conditional risk and a long risk period in a fairly small proportion of the population (about 2% of the population in recent cohorts) makes it likely that focused interventions in this subgroup would be cost-effective.

The risk factors considered in this report are more directly related to first attempts among ideators with a plan than to unplanned attempts. This can be seen most clearly in Table 3, where the OR comparing the highest- and lowest-risk groups is 2.3 for predicting a first attempt among ideators with a plan compared with between 10.8 and 115.2 for the other pathways in the table. Clearly, if effective interventions to prevent first attempts among ideators with a plan are to be developed, they will need to go beyond the standard set of risk factors considered in the current report and elsewhere in the literature to gain insights into possible intervention targets in this high-risk segment of the population.

Accepted for publication March 30, 1999.

This study was supported by grants R01 MH6376, R01 MH49098, and R01 MH52861 from the National Institute of Mental Health, Bethesda, Md, with supplemental support by grant MH6376 from the National Institute on Drug Abuse, Bethesda, and grant 90135190 from the William T. Grant Foundation, New York, NY (Dr Kessler). Preparation of this report was also supported by Research Scientist Award K05 MH00507 from the National Institutes of Health, Bethesda (Dr Kessler), and by a joint fellowship from NIDA/INVEST (National Institute on Drug Abuse International Visiting Scientists and Technological Exchange Program) and CONACYT (Consejo Nacional de Ciencia y Tecnología), Mexico City, Mexico (Dr Borges).

Collaborating National Comorbidity Survey sites and investigators are The Addiction Research Foundation, Toronto, Ontario (Robin Room, PhD); Duke University Medical Center, Durham, NC (Dan Blazer, MD, PhD, Marvin Swartz, MD); Harvard Medical School, Boston, Mass (Richard Frank, PhD, Ronald Kessler, PhD); Johns Hopkins University, Baltimore, Md (James Anthony, PhD, William Eaton, PhD, Philip Leaf, PhD); the Max Planck Institute of Psychiatry Clinical Institute, Munich, Germany (Hans-Ulrich Wittchen, PhD); the Medical College of Virginia, Richmond (Kenneth Kendler, MD); the University of Miami, Miami, Fla (R. Jay Turner, PhD); the University of Michigan, Ann Arbor (Lloyd Johnston, PhD, Roderick Little, PhD); New York University, New York (Patrick Shroot, PhD); State University of New York, Stony Brook (Evelyn Bromet, PhD); and Washington University School of Medicine, St Louis, Mo (Linda Cottler, Phd, Andrew Heath, DPhil).

A complete list of all National Comorbidity Survey publications, along with abstracts, study documentation, interview schedules, and the raw National Comorbidity Survey public use data files, can be obtained directly from the National Comorbidity Survey home page: http://www.hcp.med.harvard.edu/ncs.
Corresponding author: Ronald C. Kessler, PhD, Department of Health Care Policy, Harvard Medical School, 180 Longwood Ave, Boston, MA 02115-5899 (e-mail: Kessler@hcp.med.harvard.edu).

REFERENCES


