

Suicidal Ideation and Suicide Attempts in General Medical Illnesses

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Background: This study examines the association between the presence of a general medical illness and suicidality in a representative sample of US young adults.

Methods: Between 1988 and 1994, 7589 individuals aged 17 to 39 years were administered the Diagnostic Interview Schedule as part of a national probability survey. The survey collected information about lifetime suicidal ideation and suicide attempts, a checklist of common general medical conditions, and data on major depression, alcohol use, and demographic characteristics.

Results: Whereas 16.3% of respondents described suicidal ideation at some point in their lives, 25.2% of individuals with a general medical condition, and 35.0% of those with 2 or more medical illnesses reported lifetime suicidal ideation. Similarly, whereas 5.5% of respondents had made a suicide attempt, 8.9% of those with a general medical illness and 16.2% of those with 2 or

more medical conditions had attempted suicide. In models controlling for major depression, depressive symptoms, alcohol use, and demographic characteristics, presence of a general medical condition predicted a 1.3 times increase in likelihood of suicidal ideation; more specifically, pulmonary diseases (asthma, bronchitis) were associated with a two-thirds increase in the odds of lifetime suicidal ideation. Cancer and asthma were each associated with a more than 4-fold increase in the likelihood of a suicide attempt.

Conclusions: A significant association was found between medical conditions and suicidality that persisted after adjusting for depressive illness and alcohol use. The findings support the need to screen for suicidality in general medical settings, over and above use of general depression instruments.

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*Whensoever any affliction assails me, mee
thinks I have the keyes of my prison in mine
owne hand, and no remedy presents it selfe so
soone to my heart, as mine own sword.*

John Donne, from the
Preface to *Biathanatos*, 1608

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SUICIDE IS currently the third leading cause of death among young adults aged 15 to 34 years,¹ and the Surgeon General has identified it as one of the top public health concerns in the United States today.² Suicidal ideation and attempts are among the most important risk factors for completed suicide.^{3,4} Thus, understanding the prevalence and correlates of suicidality is crucial for both clinicians and health care policy makers.

Suicidal ideation is a core symptom of major depression, and the two are highly associated.^{5,6} Many individuals with suicidal ideation also have other psychiatric disorders, most notably subsyndromal depressive syndromes and substance abuse.

However, authors have suggested that diagnostic categories may be limited in their ability to fully describe and predict suicidal ideation and behavior, particularly in adolescents and young adults.⁷ A cohort of individuals who commit suicide have no apparent psychiatric diagnosis,⁸ and a number of factors unrelated to psychopathology (eg, demographic factors, access to weapons) have been shown to be independently associated with suicidal ideation and/or completed suicide.⁹⁻¹¹ These findings suggest the importance of understanding how factors other than psychiatric disorders, alone and in conjunction with mental disorders, are associated with suicidal ideation and behavior.

Perhaps more than any other stressor, a serious medical illness forces an individual to intimately confront issues of his or her mortality.¹² Thus, individuals with general medical illnesses might be expected to have an increased likelihood of thoughts of self-harm, if not higher rates of suicide. Psychological autopsies have

SUBJECTS AND METHODS

SUBJECTS

The study was conducted using data from the 1988-1994 National Health and Nutrition Examination Survey (NHANES), conducted by the National Center for Health Statistics to provide national estimates of the health and nutritional status of the US civilian, noninstitutionalized population. The sample design used a stratified multistage probability sample of counties, blocks, and persons randomly selected from households. Eighty-one counties were selected from 26 states from which approximately 40 000 persons of all races were selected. All selected persons were asked to complete an extensive interview and were examined in a large mobile examination center.^{18,19}

As part of the NHANES interview, the depression module of the Diagnostic Interview Schedule was administered to all examinees aged 17 to 39 years. This population comprised the sampling frame for the present study. A total of 86% of eligible individuals completed the questionnaire, for a final sample of 7589 individuals aged 17 to 39 years.

ASSESSMENT

The Diagnostic Interview Survey is a structured interview schedule developed for use in the Epidemiologic Catchment Area Study.²⁰ It is commonly used by lay interviewers in community-based samples, and has been shown to be a valid method of obtaining *Diagnostic and Statistical Manual of Mental Disorders* (DSM) diagnoses.²¹

As part of the interview, respondents were asked "Have you ever felt so low you thought of committing suicide?" and "Have you ever attempted suicide?" The Diagnostic Interview Schedule was also used (1) to assess whether a given

respondent had a DSM-III-R diagnosis of lifetime major depression and (2) to provide a count of depressive symptoms (exclusive of suicidality) as a proxy for subthreshold symptoms and for severity of illness.

NHANES interviewers asked respondents whether they had ever been told by a physician that they had 1 of the following general medical illnesses: asthma, arthritis, cancer, chronic bronchitis, diabetes, hypertension, gout, lupus, stroke, or thyroid disease. The list of conditions was drawn from the National Health Interview Survey and was chosen to represent conditions that are both prevalent and associated with substantial morbidity in the US population.²²

Although the NHANES did not explicitly assess whether respondents met DSM criteria for alcohol abuse or dependence, detailed questions were available on lifetime quantity and patterns of alcohol consumption. Heavy alcohol use was defined as any period in the past during which the respondent had regularly consumed 5 or more drinks per day, a cutoff used in other epidemiological studies.²³

STATISTICAL METHODS

First, prevalence of suicidal ideation and suicide attempts were calculated for the sample as a whole, and for individuals with each of the general medical illnesses. Next, logistic regression was used to model suicidal ideation or behavior as a function of each of the medical conditions. Each model controlled for major depression, number of depressive symptoms, history of heavy alcohol use, age, sex, income, race, education, and insurance status.

The SUDAAN statistical package (Research Triangle Institute, Research Triangle Park, NC), with appropriate weighting and nesting variables, was used for statistical comparisons because of the complex sampling design.

found that having a general medical disorder is a strong predictor of completed suicide,^{13,14} and several studies have found higher rates of suicidality in persons with particular medical conditions.^{15,16} However, these studies have used death registries or convenience samples drawn from medical clinics, limiting their generalizability to the broader US population.

Understanding the role of general medical illnesses as potential risk factors for suicidality is complex because of their high comorbidity with depression.¹⁷ If medically ill individuals are more likely to be depressed, and depressed individuals are more likely to become suicidal, then depression might fully explain the association between general medical illnesses and suicidal thoughts or suicide attempts. Alternatively, medical illnesses could represent an independent risk factor for suicidality over and above depressive symptoms. It is thus important to understand not only the magnitude of the association between general medical illnesses and suicidality, but whether such a relationship exists after controlling for depressive illness.

This study uses a US probability sample of young adults who completed a diagnostic interview that included questions about suicidal ideation, depression, and general medical conditions. The study tests the hypoth-

esis that there is a positive association between medical illness and suicidality, and that the association will persist after controlling for psychiatric morbidity.

RESULTS

CHARACTERISTICS OF THE SAMPLE

A total of 25% of the population reported at least one of the identified general medical illnesses, and 5.3% had more than 1 medical disorder. In decreasing order of prevalence, these medical illnesses were as follows: hypertension, asthma, arthritis, chronic bronchitis, diabetes, thyroid disease, cancer, and other illnesses (**Table 1**).

A total of 16.3% of respondents reported a lifetime history of suicidal ideation, and 5.5% had made a suicide attempt at some point in their lives. DSM criteria for lifetime major depression were met by 8.0% of the sample, and 9.6% reported a period during which they had regularly consumed more than 5 alcoholic drinks per day (Table 1).

A total of 29.0% of those with a lifetime history of suicidal ideation, and 37.0% of those with a history of a suicide attempt met criteria for lifetime major depression.

Table 1. Characteristics of the Sample (N = 7589)*

Demographic characteristics	
Age, mean (SE), y	28.3 (0.17)
Female	4116 (54.2)
Income, mean (SE), \$	20 020 (590)
Nonwhite	2912 (38.4)
Education, mean (SE), y	12.9 (0.10)
Uninsured	1998 (26.3)
Psychiatric symptoms, lifetime	
Major depression	604 (8.0)
Heavy alcohol use	734 (9.6)
Suicidal ideation	1244 (16.3)
Suicide attempt	417 (5.5)
Medical disorders	
Any medical	1901 (25.0)
≥2 Disorders	406 (5.3)
Specific Illnesses	
Hypertension	840 (11.1)
Asthma	504 (6.6)
Arthritis	341 (4.5)
Chronic bronchitis	271 (3.6)
Thyroid disease	108 (1.4)
Diabetes	157 (2.1)
Cancer	66 (0.9)
Other	136 (1.8)

*Data are given as number (percentage) unless otherwise specified.

Women were significantly more likely than men to report a history of suicidal ideation (20.6% vs 17.5%; $\chi^2=6.8$, $P=.01$) and attempts (7.4% vs 3.8%; $\chi^2=18.4$, $P<.001$). Other demographic factors associated with both suicidal ideation and attempts were white race (20.2% vs 13.8% of whites vs nonwhites reported suicidal ideation; $\chi^2=19.6$, $P<.001$) and lack of insurance (24.2% of those without insurance vs 18.0% of those with insurance reported suicidal ideation; $\chi^2=10.2$, $P=.02$). Age was not significantly associated with either suicidal ideation or suicide attempts.

GENERAL MEDICAL ILLNESS, DEPRESSION, AND SUBSTANCE USE

Having a medical illness was strongly associated with depression and alcohol use. Whereas 376 individuals (7.1%) who did not report a medical illness met criteria for lifetime depression, 162 (11.3%) of those with 1 medical illness ($\chi^2=4.5$, $P=.04$) and 66 (20.3%) of those with more than 1 illness ($\chi^2=12.1$, $P=.001$) had a lifetime history of depression. A total of 172 (12.5%) of patients with 1 medical illness ($\chi^2=1.5$, $P=.22$) and 62 (22.6%) of patients with more than 1 medical illness ($\chi^2=14.3$, $P<.001$) reported a period of heavy alcohol use during their lives.

GENERAL MEDICAL ILLNESS, SUICIDAL IDEATION, AND SUICIDAL BEHAVIOR

Among patients with at least 1 general medical illness, 25.2% reported suicidal ideation and 8.9% reported a suicide attempt. In multivariate models controlling for lifetime history of major depression, number of depressive symptoms, history of heavy alcohol use, and demographic characteristics, having a medical illness pre-

Table 2. Lifetime Suicidal Ideation and Attempts in Patients With Depression or General Medical Illness

	Suicidal Ideation		Suicide Attempt	
	%	Adjusted OR*	%	Adjusted OR*
Any medical illness	25.2	1.32†	8.9	1.56†
≥2 Medical illnesses	35.0	1.82‡	16.2	2.38§
Specific illnesses				
Hypertension	24.2	1.16	8.4	1.23
Asthma	30.4	1.69‡	18.7	4.34§
Arthritis	28.8	1.20	7.5	1.15
Chronic bronchitis	33.1	1.61†	18.4	2.56‡
Thyroid disease	28.6	1.28	8.5	1.19
Diabetes	14.2	1.45	5.4	1.00
Cancer	32.6	1.79	22.6	4.54‡
Other	30.0	1.49	4.5	0.56

*Odds ratio (OR) represents the odds of suicidal ideation or behavior associated with the variable of interest, adjusted for presence or absence of major depression, number of depressive symptoms, history of heavy alcohol use, age, race, insurance status, income, education, and sex.

† $P<.05$.

‡ $P<.01$.

§ $P<.001$.

dicted a 1.3 increased odds of suicidal ideation (odds ratio [OR]=1.32, $\chi^2=4.6$, $P=.03$) and a 1.6 increased odds of a suicide attempt (OR=1.56, $\chi^2=4.9$, $P=.03$) (**Table 2**).

In these multivariate models, there were no significant interactions between medical illness and major depression or alcohol abuse. Thus, medical illness and psychopathology each contributed independently to risk of suicidality, and together represented a cumulative risk for suicidal ideation and attempts.

Having more than 1 medical illness was associated with a 1.8 times increase in odds of suicidal ideation (OR=1.82, $\chi^2=7.7$, $P=.006$), and a 2.4 times increased odds of a suicide attempt (OR=2.38, $\chi^2=11.5$, $P<.001$) (Table 2).

Different illnesses showed varying patterns of association with suicidality. Asthma and bronchitis were each associated with a two-thirds increase in odds of suicidal ideation (asthma: OR=1.69, $\chi^2=6.3$, $P=.01$; bronchitis: OR=1.61, $\chi^2=5.1$, $P=.02$). Other illnesses showed non-significant trends toward increased lifetime suicidal ideation. Whereas about 1 in 18 individuals in the general population reported a suicide attempt, approximately one fifth of respondents with asthma, bronchitis, or cancer reported a suicide attempt. Having asthma or cancer increased odds of a suicide attempt more than 4-fold after adjusting for psychiatric and demographic covariates (asthma: OR=4.34, $\chi^2=18.6$, $P<.001$; cancer: OR=4.54, $\chi^2=10.5$, $P=.002$) (Table 2).

COMMENT

One of 6 respondents to the survey reported a lifetime history of suicidal ideation, and 1 of 18 reported a lifetime suicide attempt. These prevalence rates are consistent with those found in earlier national community surveys, which found lifetime rates of suicidal ideation between 12% and 17%, and rates of suicide attempts be-

tween 4% and 5% in the general US population.^{24,25} The high prevalence and potential mortality associated with suicidality underlines its importance from both a clinical and public health perspective.

Presence of a general medical illness was significantly associated with both suicidal ideation and suicide attempts, and having more than 1 illness conferred a particularly high risk. While medical illness was associated with depression and heavy alcohol use, the relationship between medical illness and suicidality persisted after adjusting for these factors, suggesting that it is not fully mediated by these disorders. Most likely, general medical illnesses represent proxies for other intermediate factors, such as functional disability, disruption of social support, or chronic pain, which in turn may lead an individual to regard life as no longer worth living.

Varying factors might lead to suicidality in different illnesses. Asthma and other pulmonary disease are illnesses characterized both by chronic disability and acute, potentially life-threatening exacerbations.²⁶ The symptom pattern seen in these illnesses is similar to that seen in panic disorder, which has been implicated as a risk factor in suicide.²⁷ Depending on the site of a malignancy, cancer may be associated with pain, disfigurement, and risk of death.²⁸ Any of these might lead a patient to consider his or her own mortality, if not suicide. Further work needs to be done in different populations and over a wider range of illnesses to better delineate the mechanisms by which particular illnesses or symptoms are associated with suicidality.

Only about one third of respondents with suicidal ideation or suicide attempts met criteria for lifetime major depression. Similarly, previous studies have demonstrated that while depression is associated with suicidality, most individuals who are suicidal do not meet criteria for major depression.^{10,29} This finding speaks to the importance of specifically screening for suicidal ideation over and above general depression inventories.

The association between general medical illnesses and suicidality makes medical clinics particularly appropriate settings in which to screen for suicidal ideation. However, assessing suicidality in medical settings may present a number of challenges, particularly in an era of increasing panel sizes and decreasing length of visits. Asking a patient about feeling suicidal is the most direct method for assessing imminent risk of self-harm; however, it may be awkward to ask this question in the absence of adequate context.³⁰ Other authors have recommended broaching the topic by asking about high-risk symptom clusters, most notably sleep disturbance, mood disturbance, and feelings of guilt.³¹ However, completing such a psychological "review of systems" may be time-consuming when competing with other demands on internists' time.³² Perhaps the most promising method for screening is through the use of self-administered screening inventories that identify patients at risk for mental disorders in primary care settings.^{33,34} Patients screening positive for such disorders are flagged as appropriate for further evaluation and possible treatment. The results of this study suggest that patients with multiple medical conditions are high-risk groups that should be

a particular focus for such screening efforts. These patients may be at risk for suicidality even when they do not meet full criteria for depression or other mental disorders.

Several limitations of the data should be noted. First, the study population only included adults aged 17 to 39 years. Although age was not significantly associated with suicidality for this sample, it is important for further research to examine the generalizability of the findings to older adults.

Second, although the survey included a diagnostic instrument for suicidality and major depression, the case identification method for medical illness relied on a checklist of selected medical conditions. Information on other medical illnesses was thus not available for the sample. Furthermore, chart data would have been useful in corroborating medical diagnoses and providing information about duration and severity.³⁵

Third, the lack of incidence data for medical and psychiatric illness limits the ability to establish causal directionality. Longitudinal studies suggest that depression may be both a risk factor for, and a consequence of, medical illness.³⁶ Similarly, we would expect, but cannot confirm from these data, that suicidality and medical illness are mutually reinforcing, with illness both leading to, and exacerbated by, hopelessness and thoughts of self-harm.

Finally, because data on rates of completed suicide were not available for this study, it is not possible to ascertain the ultimate prognosis for patients whose suicidality occurs in the context of general medical illnesses. Suicidal ideation can represent a broad continuum of thought and behavior that can occur in different contexts, for varying duration, and with a spectrum of lethality. More research is needed to determine the long-term ramifications of suicidal ideation in general medical illness, and to understand where it fits on that continuum.

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