

Methods of Adolescent Suicide Prevention

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This article reviews a series of studies developed to address the public health problem of adolescent suicide. The clinical predictors of adolescent suicide are presented, and several related prevention strategies are offered and critiqued. The method of suicide prevention found to be most effective is a systematic, direct-screening procedure that has a high potential for institutionalization.

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Adolescent suicide is an important public health problem. Each year in the United States, between 2000 and 2500 adolescents under the age of 20 commit suicide. Almost twice as many adolescents commit suicide than die from all natural causes combined. Adolescent suicide prevention is therefore an important goal, which is most likely to be achieved by a better understanding of risk factors and how and when they operate. This article summarizes relevant aspects of what is known about the origins and development of suicidality and suggests ways in which the problem could be reduced.

RISK FACTORS

Much of what we know about the characteristics of adolescents who commit suicide is derived from epidemiologically based psychological-autopsy studies. In a study of that kind that we conducted, we examined 120 of 170 consecutive suicides completed by individuals 20 years of age and younger within a 2-year period in New York, New Jersey, and Connecticut, along with 147 control subjects matched for age, ethnicity, and sex.¹ We found that 90% of suicide victims had a diagnosable psychiatric disorder at the time of their death, and more than half of these individuals had experienced significant symptoms for longer than 2 years. The distribution of

these disorders is presented in Table 1. The principal psychiatric risk factors were a past suicide attempt (approximately one third of suicide victims had made a previous suicide attempt); symptoms of a mood disorder (approximately 40% of the victims suffered from an affective disorder); and substance abuse, which was frequently comorbid with a mood disorder (approximately one quarter of all suicide victims and two thirds of older males abused substances). Conduct disorder was also common in suicide victims, but was present in many controls, and thus did not emerge as a significant risk factor. About half of the suicide victims had been in contact with a mental health professional prior to committing suicide. In most cases, however, the psychiatric attendance was for a suicide attempt and not for the treatment of mood symptoms.

This study also examined risk factors in the family environment, such as conflict between parents and between parents and children, and other measures of family disruption. After controlling for psychiatric disorder in parents and children, differences on most of these measures were quite trivial, except for a low level of parent-child communication in the suicide victims. No significant differences were found in socioeconomic status between the suicide and control groups. Overall, the findings of this work suggest that a mood disorder and/or a prior suicide attempt are far more important risk factors for suicide than family factors.

Another strand of research focuses on the neurobiology of suicide.² Systematic autopsy and in vivo studies have consistently found an elevated risk for suicide to be associated with abnormally low levels of the serotonin metabolites 5-hydroxyindoleacetic acid (5-HIAA) and homovanillic acid (HVA), a reduced concentration of 5-HT transporter enzymes in the prefrontal cortex, reduced presynaptic 5-HT receptor density, and increased postsynaptic 5-HT receptor density. These elements are thought to be associated with impulsive and volatile mood behaviors. It should be noted, however, that these findings have been

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Table 1. Psychiatric Diagnoses in Completed Suicide*

Diagnosis	Males			Females		
	Completers		Controls	Completers		Controls
	All (N = 94)	P (N = 81)	P (N = 116)	All (N = 25)	P (N = 19)	P (N = 31)
Substance or alcohol abuse	42%	25%	4%	12%	...	3%
Any disruptive	54%	31%	12%	36%	11%	7%
Any anxiety	27%	24%	9%	28%	16%	21%
Any mood	60%	38%	5%	68%	47%	3%
Schizophrenia	3%	1%	...	4%
Any diagnosis	90%	59%	23%	92%	58%	24%

*Data from reference 1. All = all informants; P = parent informants only.

demonstrated only in teenagers aged 16 and over, and it is not known what proportion of attempters have these abnormalities, nor whether these trait characteristics are stable or change as a function of psychiatric state.

Neuropsychiatric disorders are not the only factors that create risk for suicide. It appears that knowing about one suicide may facilitate suicidal behavior in others as a function of contagion or imitation. There is evidence that this process may take several different forms, including suicide epidemics or clusters, or as an aftereffect of news or fictional coverage of suicide.³⁻⁷

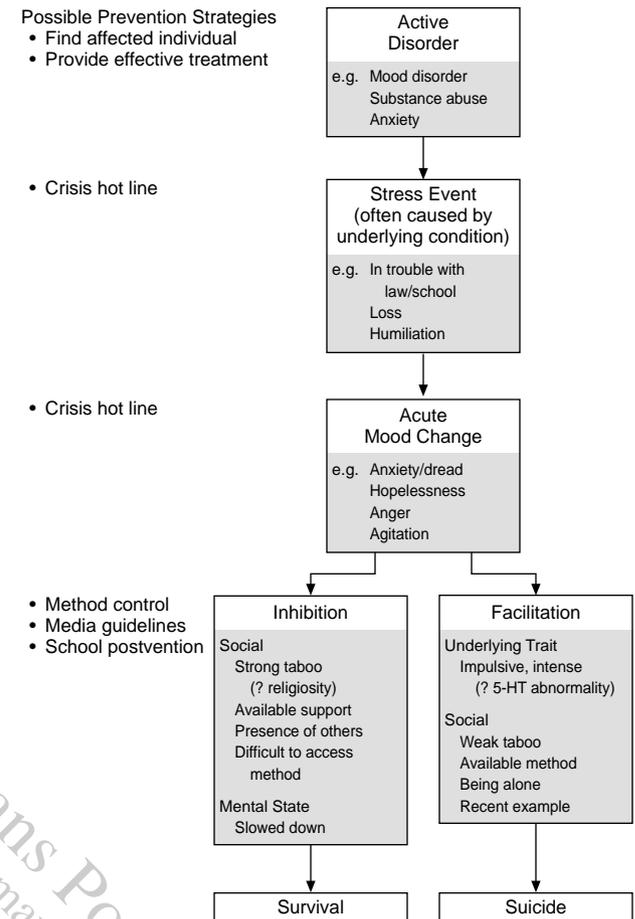
In a study conducted by Gould and Shaffer,⁵ the number of attempted and completed suicides made by adolescents in the metropolitan New York area after the broadcasting of 3 of 4 fictional television movies about suicide significantly increased compared with a baseline measurement. A second study extended the same investigation to 3 additional cities.⁷ Although the results of this examination did not fully replicate those evidenced in the first study, a significant effect was found in 1 of the 3 cities examined. This suggests that, while fictional accounts of suicide do, in fact, influence suicidal behavior, their effect interacts with other contextual factors.

A MODEL FOR SUICIDE PREVENTION

Taken together, these findings lend themselves to an heuristic model for suicide prevention (Figure 1). This model proposes that, in order to commit suicide, an underlying condition, such as a mood disorder, substance abuse, and/or aggressive traits, must be present. The suicide act itself will usually be preceded by a stress event that will often have been a result of the underlying condition. Commonly, stress events in adolescence are disciplinary crises, being in trouble with the law or at school, or the loss of a relationship. Psychological autopsy studies suggest that the stress commonly leads to extreme anticipatory anxiety, and it seems as if suicide is in some cases an avoidant response to this effect.

The risk conditions and their immediate consequences are not uncommon, and, in most instances, the chain of

Figure 1. How Does a Suicide Occur?



events does not lead to suicide. Piecing together evidence from a variety of studies, we can postulate that inhibitory and facilitating factors come into play after the precipitating event and that the balance between them will determine whether the outcome is fatal or otherwise. Inhibiting factors that make suicide less likely include living in a culture in which suicide is strongly taboo, having available support or the presence of others, and having a slowed-down mental state. Conversely, the presence of other factors may facilitate suicide. These include living in a culture in which taboos about suicide are weak, having ready access to weapons or other methods of suicide, learning of a recent example of suicide by hearsay or in the media, being in an agitated or excited state, and being alone.

This model suggests a number of prevention strategies. At the tail-end of the process, weapon control or media guidelines might reduce risk. While method control appears to be an obvious and realistic choice, research indicates such efforts produce negligible effects. A recent study examined the efficacy of this method by looking at the impact of gun-safe storage laws in 12 states on the

gun-related deaths of children under the age of 15.⁸ While the rate of accidental shooting deaths decreased by 23% after the introduction of these laws, neither the gun-related homicide nor suicide rates showed statistically significant declines. There is not a great deal of research in this area, but what does exist indicates that method control might not be the most profitable approach to suicide prevention.

The Centers for Disease Control and Prevention (CDC) convened a national workshop to address the problem of communicability and generated preventative guidelines for media professionals to minimize suicide facilitation.⁹ To date, no studies have been done to demonstrate the efficacy of the CDC's guidelines. But, if successful, the frequent turnover of editorial staff would require continuous reeducation.

Hot lines and crisis services are designed to intervene at the penultimate stage before suicide, at a time when the suicidal person is most vulnerable. While these readily available services have the potential to positively affect mental state in the midst of a stress event or acute mood change, research suggests that they have little impact on suicide rates in the community.¹⁰⁻¹³ There may be several reasons for this. First, hot lines fail to reach those at greatest risk. Suicide is a predominantly male behavior, but most hot line callers and crisis-service users are female and not suicidal. Second, suicide is most often an impulsive act. As a result, many victims do not take the time to fully ponder other alternatives, such as reaching out for help from a trained crisis counselor. Third, it has been demonstrated that crisis services often give inappropriate advice. Research conducted on what is said and the circumstances that transpire when calls are placed to hot lines reveals a tendency toward the provision of generic advice regardless of the callers' problems. Crisis services and hot lines are readily available, however, and may have the potential to be enhanced by appropriate advertising and training in more varied responses.

At the most distant point on the flow diagram, suicide prevention would involve finding individuals who are at risk for suicide and providing them with treatment regardless of their current degree of suicidality.

SUICIDE PREVENTION SCREENING METHODS

Broadly speaking, there are 3 case-finding strategies that can be employed to this end. The first, commonly practiced in the United States, educates high school students about suicide in a way that is designed to reduce its stigma and to promote self-referral. The second is to educate those who encounter adolescents—teachers, parents, or other teens—and teach them how to identify individuals at risk and how to establish a connection with an appropriate source of help. The third strategy is direct screening, in which teenagers themselves are asked to indicate their mood and whether or not they are suicidal. Their replies

are examined, and, if abnormal, the teenagers are referred for clinical care.

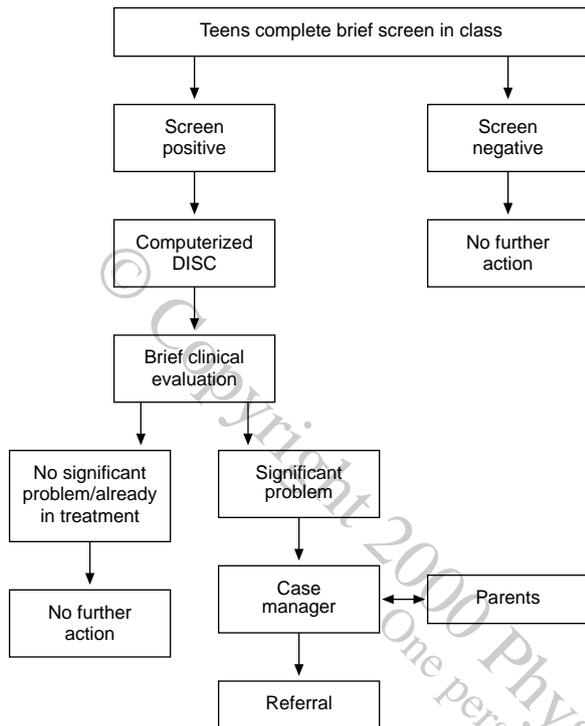
Two studies of note have examined the educational strategy of case-finding by destigmatization. The first study¹⁴ examined the impact of 3 school-based suicide-prevention programs administered to 758 high school students and 680 controls matched for age, ethnicity, and socioeconomic status. The results of this investigation revealed that, although most students found the suicide prevention programs to be helpful and informative, their implementation did not significantly increase knowledge, self-identification, or help-seeking behavior.

An 18-month follow-up study¹⁵ was conducted on these students in order to ascertain the long-term impact of the above-mentioned school-based suicide-prevention curricula. One hundred seventy-four of the high school students and 207 of the controls participated in the follow-up, which failed to provide adequate evidence of the programs' effects. In fact, students who were exposed to the programs were significantly less likely than controls to seek help for a serious personal or emotional problem. They were also significantly less likely to encourage a depressed or troubled friend to seek professional help. Another result of the study was that the students' model of suicide was negatively affected by the prevention program; that is, those students who entered the program believing that suicide was not a reasonable response to stress were more likely to change their minds after program delivery and consider suicide an understandable, possibly reasonable response to stress. The results of the original and follow-up studies suggest that destigmatization programs commonly practiced in educational settings are not effective.

The second educational strategy, that of educating third parties, such as teachers, parents, and peers, to identify those at risk for suicide and to then refer them for treatment, while logical in principle, is problematic in practice. Very often, there is an absence of external signs of suicidality or depression. Furthermore, the "warning" signs that are taught to parents, teachers, and peers, such as declining grades, social withdrawal, and loss of interest are highly nonspecific. If students are trained to look for potentially problematic and risky behavior in their peers and then offer advice, we are in effect promoting a highly intrusive and, most likely, very inaccurate intervention.

The third approach, while it may take place in a school setting, is a strategy that does not have an educational component. This approach, a self-administered method of direct screening, differs from the 2 previous methods in that it does not involve suicide-awareness lectures or charge students and teachers with the task of acting like mental health professionals. Instead, it involves systematic screening for the predictors of suicide in general high school populations. Students are asked directly and confidentially whether they are experiencing any symptoms of depres-

Figure 2. Suicide Prevention Screening Method*



*Abbreviation: DISC = Diagnostic Interview Schedule for Children.

sion, have suicidal ideation or have ever made a suicide attempt, and/or have an alcohol- or substance-abuse problem.

In our hands, this suicide-prevention method employs a 3-stage screening process (Figure 2). In the first stage, students complete a brief self-report questionnaire, the Columbia Teen Screen,¹⁶ in a health-related class. On the basis of their answers, students who might be at an elevated level of risk are advanced to the second phase of the process and further assessed through the employment of a computerized diagnostic interview, the DISC (Diagnostic Interview Schedule for Children),¹⁷ which can be administered by lay interviewers at relatively low cost. One of the many benefits of the 2-stage process generally, and that of the DISC specifically, is that it reduces the number of students who have to be seen by a clinician by screening out those students who are not at risk. At the end of each DISC interview, the computer generates a diagnostic report that is presented to a clinician who interviews students personally in the third and final stage of the screening process. The purpose of this face-to-face clinical interview is to determine whether or not the identified student needs to be referred for treatment or further evaluation. Those considered to be at high risk for suicide are students who admit to a suicide attempt or recent ideation, have either major depressive disorder or dysthymic disorder, or have an alcohol- or substance-abuse problem. Finally, a case man-

ager contacts the students' parents in order to assist students who are deemed to be in need of additional intervention and also to ensure treatment compliance.

A 1996 study¹⁶ examined the efficacy of this suicide-prevention method in 2004 teenagers from 8 New York metropolitan area high schools. Five hundred forty-six of the total number screened had a positive Columbia Teen Screen; that is, they met at least 1 of the positive-screening criteria for depression, dysthymia, substance or alcohol abuse, or recurrent suicide ideation or previous attempt. The sensitivity of the Columbia Teen Screen was approximately 88%, and specificity was 76%. These settings resulted in only 3 screen-negative students who met the criterion and were indeed at risk, but were not detected by the Columbia Teen Screen. In addition, there were 257 false-positive screens, which highlights the importance of being able to have a second phase to screen out those who are not actually at risk for suicide. Another finding of this work was that the problems of many adolescents who were at high risk for suicide were not known to others, and thus these students had never received any treatment. Only 31% of those who suffered from major depressive disorder, 26% of those with recent and frequent suicide ideation, and 50% of those who made a past suicide attempt were actually in treatment.

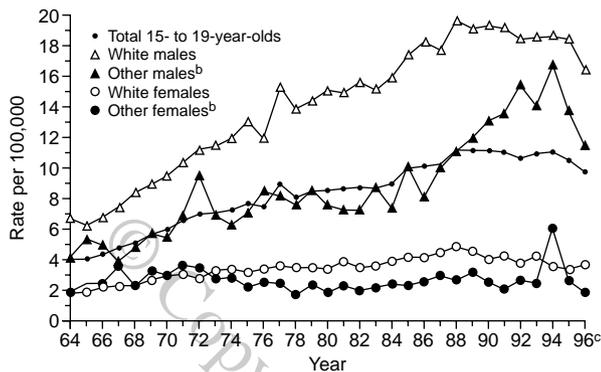
Directly screening teenagers to identify those at high risk is not only efficient, but it is also cost effective. The current cost of this screening procedure is \$37 per student screened, or just under \$250 per student referred. The overall cost to screen approximately 1000 students is about \$25,000. This cost will decrease in the near future, however, as the DISC is now being made into a spoken, self-completion (Voice DISC) version that will eliminate the need for interviewers and also enhance outreach. Within the year, we anticipate being able to go into a high school, distribute the Columbia Teen Screen, and then set up an entire classroom with laptop computers complete with headphones, enabling 20 to 25 students to independently complete the DISC interview at the same time. Not only will the Voice DISC cut costs, it will also increase the rate at which teenagers can be screened, thus making the screening process even more efficient and succinct. With these technological advances, it will be possible to incorporate this screening method into high school health evaluations that are already routinely conducted.

CURRENT TRENDS IN ADOLESCENT SUICIDE

The most recent adolescent suicide statistics available may give cause for encouragement. As can be seen in Figure 3, white males have historically held the highest suicide rate.¹⁸ In recent decades, their rate began a 23-year increase in 1965, reaching a peak in 1987, at which point it remained fairly constant for several years.

An exciting change occurred in 1996, though, and the white-male suicide rate evinced a dramatic and inexpli-

Figure 3. Adolescent Suicide Rates (15- to 19-Year-Olds) 1964–1996*



*From reference 18 and National Center for Health Statistics. Deaths from 72 selected causes, by 5-year age groups, race, and sex: United States, 1995 (unpublished Worktable 210, 1995), Hyattsville, Md: Public Health Service.

^bThe "Other" groups include all non-whites.

^cProvisional NCHS data, December 1997.

cable reduction. One possible explanation for this decrease is a natural periodicity that is not fully understood. Another explanation is that an alcohol or drug effect on the elevation of the suicide rate coincided with an increase in the rate of alcohol exposure during this period. There is some evidence that substance- and alcohol-use, although not abuse, rates are dropping, and this change could account for the decreasing male suicide rate. Another possible explanation is that we could be seeing the effects of therapeutic treatment. Prior to 1992, adolescent depression was rarely treated with tricyclics due to their known side effects, lethality at even modest overdose levels, and low compliance rates. Today, however, selective serotonin reuptake inhibitor (SSRI) antidepressants are prescribed with increasing frequency, and the reduction in the suicide rate could be a direct result of this change in treatment strategy.¹⁹

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