

## Completed Suicide After a Suicide Attempt: A 37-Year Follow-Up Study

Kirsi Suominen, M.D., Ph.D.

Erkki Isometsä, M.D., Ph.D.

Jaana Suokas, M.D., Ph.D.

Jari Haukka, Ph.D.

Kalle Achte, M.D., Ph.D.

Jouko Lönnqvist, M.D., Ph.D.

**Objective:** Attempted suicide is the strongest known predictor of completed suicide. However, suicide risk declines over time after an attempt, and it is unclear how long the risk persists.

Risk estimates are almost exclusively based on studies of less than 10 years of follow-up.

**Method:** The authors followed a cohort of 100 consecutive self-poisoned patients in Helsinki in 1963, for whom forensically classified causes of death during the following 37 years were investigated.

**Results:** They found that suicides continued to accumulate almost four decades after the index suicide attempt.

**Conclusions:** A history of a suicide attempt by self-poisoning indicates suicide risk over the entire adult lifetime.

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A nonfatal suicide attempt is the strongest known clinical predictor of eventual suicide (1). Suicide risk among self-harm patients is hundreds of times higher than in the general population (2). It is often estimated that about 10%–15% of attempters eventually die by suicide. However, the risk is highest during the first months and years after the attempt and appears to decline over time. Estimates of lifetime suicide mortality are almost exclusively based on studies with only up to 10 years of follow-up. Before the era of modern psychiatric treatments, one early study (3) followed a cohort of suicide attempters hospitalized during the period 1933–1942 over 30 years, but whether the findings are still relevant is uncertain. Another study followed attempters for about 20 years (4), but it had a high attrition rate (37%) and classification of causes of death was not based on forensic medical examination. Whether suicide attempts continue over the whole lifetime after an attempted suicide has not been investigated during the era of modern psychiatric treatment. The aim of the present study was to determine the rate of suicide after attempted suicide over a follow-up period of almost four decades.

### Method

The study group consisted of 100 consecutive patients who had attempted suicide by self-poisoning in Helsinki in 1963 and were subsequently admitted to the intoxication ward of Hesperia Hospital (Helsinki Municipal Central Mental Hospital) (5). In 1963, Hesperia was the only hospital in Helsinki for the treatment of intoxication.

The outcome of suicide attempts, with the use of suicide mortality as the outcome criterion, was examined for a follow-up period of 37 years (Feb. 10, 1963, to Dec. 31, 2000). Death data were obtained from Statistics Finland, and the cause of death came from death certificates. The study was approved by the institutional review board of Finland's National Public Health Institute. The definition of suicide was based on Finnish law for determin-

ing causes of death. In Finland, in every case of violent, sudden, or unexpected death, the cause of death is assessed by police and medicolegal investigations involving an autopsy and forensic examination.

Two patients were lost to follow-up, leaving 98 consecutive subjects who could be traced over a 37-year period after an attempted suicide attempt in Helsinki in 1963 (71 women: mean age=32.7 years, SD=13.5, range=14–63; 27 men: mean age=31.4 years, SD=10.5, range=16–55). At the time of the index suicide attempt, 12% of the men and 3% of the women were living alone. A minority of the patients (33% of the men and 27% of the women) reported that they had made their index suicide attempt impulsively; 23% of the men and 31% of the women had communicated their suicidal intent before the attempt. The men had used alcohol before the attempt more often than the women (63% versus 27%) ( $p=0.002$ , Fisher's exact test) and had markedly more alcohol abuse or alcohol dependence (56% versus 13%) ( $p<0.001$ , Fisher's exact test). Eleven percent of the men and 13% of the women had reported psychotic symptoms, and 41% of the men and 31% of the women had reported depressive symptoms. Thirty-three percent of the women and 11% of the men with psychotic symptoms had comorbid alcohol abuse or dependence. Alcohol abuse or alcohol dependence was significantly more common among men with depressive symptoms than among women with depressive symptoms (55% versus 10%) ( $p=0.01$ , Fisher's exact test). The methods have been reported previously in detail (5).

### Results

By the end of the follow-up, 54 subjects who had attempted suicide in 1963, i.e., 55% of 98, had died: 35 from natural causes, three from accidents, and three from undetermined causes. Thirteen percent (13 of 98) had committed suicide: six of 71 women (8%) and seven of 27 men (26%) ( $p=0.04$ , Fisher's exact test). The method of suicide was drug overdose in 62% of the cases (eight of 13; five men and three women), hanging in 31% (four of 13; two men and two women), and jumping in 8% (one of 13; one woman). Two-thirds of the suicides (62%, eight of 13) occurred at least 15 years after the suicide attempt. The dif-

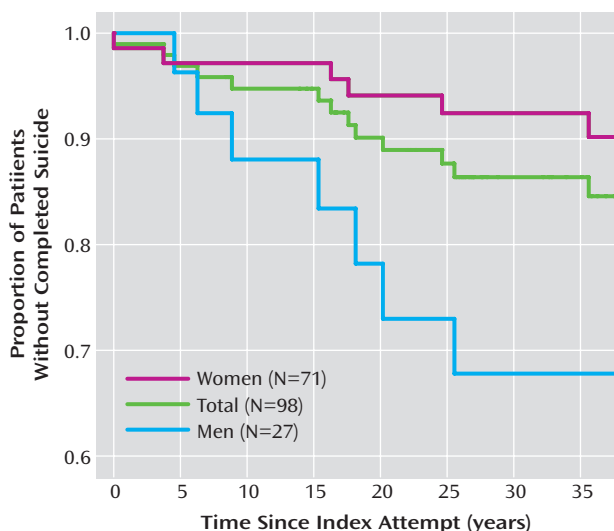
ference in survival between the men and the women was tested with the log-rank test. Mortality was significantly higher among the men ( $\chi^2=7.2$ ,  $df=1$ ,  $p=0.007$ ). The temporal distribution of survival over the follow-up period is shown in the Kaplan-Meier curve, based on 2,801 person-years (Figure 1).

Inclusion of undetermined and undetermined plus accidental deaths as possible suicides raised the proportion of suicides up to 16% or 19% of the group, respectively, but had little influence on the temporal pattern of their accumulation. Higher suicide mortality among the men persisted after inclusion of undetermined ( $\chi^2=10.2$ ,  $df=1$ ,  $p=0.001$ ) and undetermined plus accidental deaths ( $\chi^2=13.5$ ,  $df=1$ ,  $p=0.0002$ ).

## Discussion

We found that after index suicide attempts by self-poisoning in 1963, completed suicides continued to accumulate almost four decades after the index suicide attempts. Our study group of consecutive suicide attempters had the longest follow-up period published to date, to our knowledge, and virtually all (98%) of the subjects could be traced. Although the statistical power for internal comparisons was small, we found a significant difference in suicide mortality between the men and the women. To what extent this was a consequence of some of their characteristics, such as markedly more prevalent alcoholism, remains uncertain. Due to several technical difficulties, we were not able to construct a comparison cohort from the general population of Helsinki in 1963 to estimate the risk ratio for completed suicide. Another limitation is that the group consisted of suicide attempts made by self-poisoning, thus, the generalizability of the findings to suicide attempts made by other methods remains to be investigated. Nevertheless, self-poisoning is by far the most common method used in suicide attempts. Because of the law in Finland, the classification of causes of sudden and unexpected deaths is always based on careful forensic examination and is therefore considered reliable although not completely without bias. Based on data collected during the research phase of the National Suicide Prevention Project in Finland, hidden suicides among undetermined deaths have been estimated to reduce the true national suicide rate by 10% (6). In the present study, inclusion of undetermined or undetermined plus accidental deaths as possible suicides raised the overall lifetime suicide rate to almost one-fifth but had little impact on the temporal pattern or the difference in risk between men and women.

**FIGURE 1. Cumulative Proportion of Patients Surviving in the 37 Years Following a Suicide Attempt<sup>a</sup>**



<sup>a</sup> Of the 98 subjects, 13 committed suicide during follow-up: six women and seven men.

For the purposes of suicide prevention, the implications of our findings are clear. A history of a suicide attempt by self-poisoning appears to be an indicator of high risk for completed suicide throughout the entire adult lifetime.

Received March 30, 2003; revision received July 30, 2003; accepted Aug. 11, 2003. From the Department of Mental Health and Alcohol Research, National Public Health Institute, Helsinki; Department of Psychiatry, Jorvi Hospital, Helsinki University Central Hospital, Espoo, Finland; and Helsinki City Northeast Health District/Department of Psychiatry, Helsinki. Address reprint requests to Dr. Suominen, Department of Mental Health and Alcohol Research, National Public Health Institute, Mannerheimintie 166, FIN-00300 Helsinki, Finland; kirsi.suominen@ktl.fi (e-mail).

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