

## Depression and suicide on Gotland An intensive study of all suicides before and after a depression-training programme for general practitioners

Zoltán Rihmer<sup>a,\*</sup>, Wolfgang Rutz<sup>b</sup>, Hans Pihlgren<sup>b</sup>

<sup>a</sup> *In- and Outpatient Department of Psychiatry XIII, National Institute for Psychiatry and Neurology, Budapest, Hungary*

<sup>b</sup> *Department of Psychiatry, Visby Hospital, Visby, Gotland, Sweden*

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### Abstract

In 1983 and 1984, the Swedish Committee for the Prevention and Treatment of Depression (PTD) organised a postgraduate training programme on the diagnosis and treatment of depression to all the general practitioners on Gotland, Sweden. In the following years, the frequency of suicide and inpatient care for depression decreased significantly, as well as the frequency of sick leave for depression. The results of the Gotland study have provided evidence for the view that early recognition and adequate treatment of depression is one essential method of suicide prevention (Rutz et al., 1989; Rutz et al., 1992). A detailed retrospective clinical analysis, of all 115 consecutive suicide victims on Gotland between 1981 and 1992 presented in this study, showed that male gender and violent methods were overrepresented. 50 suicides had a DSM-III-R axis I diagnosis and half of them ( $n = 25$ ) had primary major depression. Bipolar II disorder was relatively overrepresented in this sample. After the PTD programme, the proportion of depressive suicides was significantly lower than before. This finding strongly suggests that the significant decrease in the suicide rate after the PTD programme is a direct result of the robust decrease in depressive suicides of the area served by trained GPs. The practical importance of this finding is briefly discussed.

**Keywords:** Depression; Suicide; General practitioner; Suicide prevention

### 1. Introduction

In spite of the great progress in the diagnosis and treatment of depression, the most common psychiatric disorder, it remains extremely underreferred, underdiagnosed and undertreated (Barraclough et al.,

1974; Brugha and Bebbington, 1992; Isacsson et al., 1994; Isometsa et al., 1992; Isometsa et al., 1994; Maier et al., 1992; Rihmer et al., 1990a; Rihmer et al., 1990b; Wells et al., 1994). Especially, general practitioners (GPs) seem to have difficulties in detecting depression (Joukamaa et al., 1994; van den Brink et al., 1991). Particularly, depressions with predominantly somatic symptom presentation (i.e., masked depression) (Zung and King, 1983) and with significant somatic comorbidity (i.e., compound de-

\* Corresponding author. Address: National Institute for Psychiatry and Neurology, Budapest 27, Pf. 1. 1281 Hungary. Fax: (36) (1) 1763-402.

pression) (Tylee et al., 1993) remain unrecognized in primary care. A significant proportion of persons who are high utilizers of health care have depression (von Korff et al., 1992) and depression, when identified, can be treated successfully in primary care (Rosenberg et al., 1994; van den Brink et al., 1991).

Because of the well-documented association between depression and suicide Coppen (1994) considers depression as a lethal disease and points out that adequate acute and prophylactic treatment can reduce substantially the suicide mortality in this patients.

Understanding the significant role of the GPs in the early recognition and treatment of depression, the Swedish Committee for the Prevention and Treatment of Depression (PTD) organised a postgraduate educational programme on the diagnosis and treatment of depression directed to all GPs on Gotland (the population of which is nearly 60 000).

The training was given twice, one in 2-day programmes in 1983 and one in 1984. The programme was described in details elsewhere (Rutz et al., 1989; Rutz et al., 1992). In the following years, the frequency of suicide and inpatient care for depression decreased significantly, as well as the frequency of sick leave for depression. The prescription of antidepressants increased, whereas the prescription of neuroleptics, sedatives and hypnotics decreased. In 1988, 4 years after the educational programme ended, the inpatient care for depression and the suicide rate returned again to almost baseline values and the prescription of antidepressants stabilized, indicating that the effects were strictly time-related to the educational programmes. While the mentioned favorable, but transient, changes were not demonstrable on the Swedish mainland during the same period, the results of the Gotland study have provided strong (indirect) evidence for the view that early recognition and adequate treatment of depression is the most important method in suicide prevention (Rutz et al., 1989; Rutz et al., 1992).

Our hypothesis that the marked decline of the suicide rate after the PTD programme was the consequence of the significant decrease in depressive suicides was tested directly by a retrospective analysis of Gotlandian suicides while one of us (Z. Rihmer) was a visiting professor at the Psychiatric Hospital, Visby, Gotland, in January and February 1993.

## 2. Methods

### 2.1. Sample and procedures

All suicides on Gotland between 1 January 1981 and 31 December 1992 known to the local police were investigated concerning age, residency, method of suicide (violent or nonviolent), previous suicide attempts and lifetime history of psychiatric and/or medical disorders. During the mentioned period, there were 124 completed suicides on Gotland. 9 victims were excluded because they were visitors or tourists from foreign countries or from the Swedish mainland. In this study we analyzed the demographic and clinical characteristics of the 115 consecutive Gotlandian suicides.

Demographical data of the suicide victims, the time and method of suicide were obtained from the police record. Data on previous suicide attempts and psychiatric and somatic morbidity were collected from the typewritten medical records made by psychiatrists or GPs. It should be noted that a detailed medical record was written in each case if the patient had contacted at least once a psychiatrist or GP, regardless of the nature of the illness or complains. Informative charts were available in 98 cases (85% of the total sample).

During an intensive, retrospective chart review, a diagnostic reclassification was made by two of us (H. Pihlgren and Z. Rihmer) according to the DSM-III-R criteria (American Psychiatric Association, 1987). This method is appropriate to make a retrospective lifetime diagnosis, at least until the moment of the last note written into the chart. However, this procedure underestimates the prevalence of psychiatric morbidity at the time of the suicide.

### 2.2. Data analysis

For statistical comparison,  $\chi^2$  statistics were used with Yates correction if appropriate.

## 3. Results

Table 1 shows the main demographic and clinical characteristics of the 115 consecutive suicides. The

Table 1  
Main characteristics of 115 consecutive suicide victims on Gotland between 1981 and 1992

Mean age (years)	47.7
range (years)	14–88
Male, <i>n</i> (%)	89 (77)
Female, <i>n</i> (%)	26 (23)
Method of suicide	
violent <sup>a</sup> , <i>n</i> (%)	77 (67)
male, <i>n</i> (%)	63 (82)
nonviolent, <i>n</i> (%)	38 (33)
male, <i>n</i> (%)	26 (68)
Previous suicide attempt, <i>n</i> (%)	33 (29)
male, <i>n</i> (%)	27 (82)
Informative charts, <i>n</i> (%)	98 (85)
male, <i>n</i> (%)	87 (89)
Informative charts	
from GPs only, <i>n</i> (%)	40 (41)
from psychiatrists only, <i>n</i> (%)	10 (10)
from both, <i>n</i> (%)	48 (49)
DSM-III-R axis I diagnosis, <i>n</i> (%)	50 (44)
male, <i>n</i> (%)	38 (76)

<sup>a</sup> Hanging, jumping, shooting, arterial section, etc.

mean age was 48 years and 77% of them were males. Two-thirds of the sample died by a violent method. The rate of violent suicides was higher in males (63/89 = 71%) than in females (14/26 = 54%) but this difference is not significant ( $\chi^2 = 2.61$ , *df* = 1, NS). 29% of the victims made suicide attempt(s) in the past. Only one-fourth (9/33 = 27%) of the 33 victims with a previous suicide history have made violent attempt. However, in this subpopulation, the distribution of violent/nonviolent methods at completed suicide was equal (17 violent and

Table 2  
Specific diagnoses and subdiagnoses of 50 victims with a lifetime history of DSM-III-R axis I disorder

	<i>n</i>	%
Primary major depression	25	50
Nonbipolar	14	
first episode	6	
recurrent unipolar	8	
Bipolar II	9	
Bipolar I	2	
Primary alcohol/drug abuse (dependency)	19	38
Schizophrenia	3	6
Other	3	6

Table 3  
Distribution of previous suicide attempts in depressive and nondepressive suicides

	Rates of previous suicide attempts	%
Depressive suicides	12/25	48 <sup>a</sup>
Nondepressive suicides	21/90	23 <sup>b</sup>

a vs. b:  $\chi^2 = 5.81$ , *df* = 1, *P* < 0.05.

16 nonviolent, these figures are not shown in the table). 59% of subsample who had medical records had been seen by psychiatrists previously and 41% had had charts only in the offices of the GPs. According to the intensive, retrospective chart review, 50 victims (44% of the total sample) had a DSM-III-R axis I diagnosis at some points of their life.

Table 2 shows the distribution of their specific psychiatric diagnoses. Half of this subsample (25/50) had lifetime diagnosis of primary major depression. This table also displays the distribution of different subtypes regarding the polarity (nonbipolar, bipolar II, bipolar I) among the victims with lifetime history of primary major depression.

Table 3 shows that a significantly higher proportion of 'depressive suicides' than 'nondepressive suicides' had made one or more previous suicide attempts.

Table 4 shows the major finding of this study. The rate of 'depressive suicides' among all suicides was significantly lower after the PTD programme (1 July 1983–31 December 1992) than before it (1 January 1981–31 June 1983). If we compare the two symmetrical time periods only (2.5 years before and 2.5 years after the PTD programme), the difference

Table 4  
Proportion of depressive suicides among all suicides before and after PTD programme

	Rates of depressive suicides	%
Before PTD (2.5 years)	11/26	42 <sup>a</sup>
After PTD (2.5 years)	2/17	12 <sup>b</sup>
After PTD (9.5 years)	14/89	16 <sup>c</sup>

a vs. b:  $\chi^2 = 3.21$ , *df* = 1, NS.

a vs. c:  $\chi^2 = 8.35$ , *df* = 1, *P* < 0.01.

Table 5  
Medical comorbidity in depressive and nondepressive suicides and before and after PTD programme

	Rates of medical comorbidity	%
Depressive suicides	5/25	20 <sup>a</sup>
Nondepressive suicides	8/90	9 <sup>b</sup>
Before PTD programme	6/26	23 <sup>c</sup>
After PTD programme	7/89	8 <sup>d</sup>

a vs. b:  $\chi^2 = 2,41$ ,  $df = 1$ , NS.

c vs. d:  $\chi^2 = 4,64$ ,  $df = 1$ ,  $P < 0.05$ .

is more impressive, but due to the small numbers it is not, but almost, significant ( $\chi^2 = 3,21$ ,  $df = 1$ , NS).

Table 5 displays the data on medical comorbidity of the 115 victims. 13/115 suicides (11%) had significant medical disorders (hypertension, diabetes mellitus, migraine etc.). Depressive suicides show a tendency to have a higher rate of medical disorders and the rate of medical comorbidity was significantly lower after the PTD programme than before it.

#### 4. Discussion

Male gender and violent methods are overrepresented in our sample, which is in agreement with the previous data on consecutive suicides (Barraclough et al., 1974; Goodwin and Jamison, 1990; Henriksson et al., 1993; Pokorny, 1960; Seager and Flood, 1965). However, the retrospective nature of the clinical data collection (and especially the retrospective diagnostic procedure) and the fact that not all victims have medical records, limit the validity and generalizability of our results. Probably, the data on previous suicide attempts are free of this bias, since persons with a suicide attempt were generally seen by doctors and had a medical chart or a new chart note. There is no doubt that our retrospective diagnostic procedure underestimates the prevalence of psychiatric and somatic morbidity. One might have a chart at the GP on the reason of a medical illness, but may later become depressed and suicidal without any new medical contact. Probably, some first depressive episodes were missed in this way. However,

this bias is equally present before and after the PTD programme and in this way it does not invalidate our main finding: the proportion of depressive suicides decreased significantly after the PTD education and bipolar II depression were overrepresented among suicide victims (see later in detail).

The diagnostic distribution of the 50 victims with a DSM-III-R axis I diagnosis (primary major depression followed by substance abuse and schizophrenia) are in good agreement with the previously published results (Arató et al., 1988; Barraclough et al., 1974; Goodwin and Jamison, 1990; Henriksson et al., 1993; Pokorny, 1960).

Among the 25 suicides with a lifetime history of primary major depression, 14 (56%) had nonbipolar depression (first episode and recurrent combined), 9 (36%) had bipolar II disorder and 2 (8%) had bipolar I illness. Since the lifetime prevalence of nonbipolar major depression in the general population is nearly 20% and the same figures for bipolar II and bipolar I disorders have been reported between 0.3 and 1.3% (Faravelli et al., 1990; Kessler et al., 1994; Maier et al., 1992; Weissman and Myers, 1978) the persons with bipolar II depression were overrepresented in our sample. These data support the results of Bulik et al. (1992); Dunner et al. (1976) and Endicott et al. (1985) that bipolar II patients have higher lifetime risk of suicide attempts than persons with unipolar or bipolar I disorder. This also confirms our earlier findings that bipolar II patients are markedly overrepresented among consecutive suicides (Rihmer et al., 1990a).

In agreement with the results of Isometsa et al. (1994) we have also found that nearly half of our depressive suicides (48%) had previous suicide attempts. This rate is significantly higher than that found in our nondepressive suicides (23%,  $\chi^2 = 5,81$   $df = 1$ ,  $P < 0.05$ ). These figures are compatible with the findings of Barraclough et al. (1974); Pokorny (1960); Seager and Flood (1965) showing that 16–32% of consecutive suicide victims (many, but not all of them, were depressed) made suicide attempt in the past.

The higher rate of medical comorbidity of depressive suicides than nondepressive victims corresponds to the result of Lyness et al. (1993) and Yates and Wallace (1987) that depressed subjects have higher rate of comorbid somatic disorders (especially hyper-

tension and diabetes mellitus) than would be expected by chance. The proportion of comorbid medical disorders was significantly lower after the PTD programme. Since GPs seem to have difficulties especially in recognizing depression with significant somatic comorbidity (Tylee et al., 1993), this lower rate of somatic disorders of the victims after the PTD programme may be the reflection of the improved diagnostic capacity of GPs in complicated cases too.

Before the PTD education, almost half of all suicides had had primary major depression (14/26 = 42%), which is a similar rate to those published by several authors from different parts of the world (Arató et al., 1988; Barraclough et al., 1974; Goodwin and Jamison, 1990; Henriksson et al., 1993).

The rate of depressive suicides among all suicides decreased significantly after the PTD programme. In spite of the fact that our before vs. after comparison of clinical data can not control other contemporary events, this finding strongly suggest that the significant decrease in the suicide rate as well as other favorable changes after the PTD education (Rutz et al., 1989; Rutz et al., 1992) were a direct result of the robust decrease in depressive suicides of the area served by trained GPs.

Surprisingly, further analysis of the sex distribution in depressive suicides showed that the rate of depressive suicides in females decreased dramatically after the PTD programme, while the proportion of male depressive suicides was almost unchanged after the PTD education. This finding has already been described and discussed in detail in other papers (Rutz et al., 1995a; Rutz et al., 1995b).

Depression is, however, the most important risk factor for suicide. Fortunately, self-destructive behavior does usually not occur suddenly in the first days or weeks of the mood disturbance. This way, several weeks or months are available for doctors to make an appropriate diagnosis and adequate treatment, at least for those patients who contact them.

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