Eur Arch Psychiatry Clin Neurosci (2002) 252 : 28 – 32

ORIGINAL PAPER

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The occurrence of suicide in severe depression related to the months of the year and the days of the week

Received: 28 March 2001 / Accepted: 29 November 2001

Abstract The purpose of the present study was to investigate the distribution of suicide during the months of the year and the days of the week in severe depression. A total of 1206 in-patients rated at discharge from the Department of Psychiatry, Lund, Sweden, on a multiaxial diagnostic schedule received the diagnosis severe depression/melancholia between 1956 to 1969. When followed up to 1998, a total of 114 depressed patients had taken their own life. Out of these, 98 patients appeared to have a primary depression. The monthly distribution of suicides showed a significant peak in October/November for men (41 % of all male suicides). No correlation with the onset of depression could be detected. Furthermore, there was a preponderance of suicide on Sundays for both sexes (31 % of all suicides).

Key words Suicide · depression · monthly distribution · days of the week

Introduction

Depression is the most common diagnosis among patients who complete suicide. A review has shown that on the average 52 % of all suicide victims have suffered from a depression (Lönnquist 2000).

As depression sometimes shows a seasonal pattern (APA 1994), the occurrence of depression has been correlated to the seasonality of suicide. A coincidence between depression and suicide in the spring and autumn (Eastwood and Peacock 1976), spring and winter (Maes et al. 1993b), or spring in females (Parker and Walter 1982) has been shown.

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EAPCN 352

Seasonality of suicide has been studied since the nineteenth century. In an early review by Morselli in 1879 (Massing and Angermeyer 1985), it was noticed a steady increase in suicide rates from the beginning of the year with a peak in June and then a decrease until the end of the year. This unimodal distribution of suicide with spring peaks has later been shown in an extensive review Massing and Angermeyer (1985) and by others in the Northern and Southern Hemisphere (Parker and Walter 1982, Maes et al. 1993a, Chew and McCleary 1995, Flisher et al. 1997). Still, a second less clearly defined peak in the autumn was found in one fifth of the studies according to Massing's review (1985).

A bimodal distribution with two peaks has sometimes been found, mostly for females (Meares, et al 0.1981, Nähyä 1982, 1983, Hakko et al. 1998), for both sexes (Lester and Frank 1988, Altamura et al. 1999) or males (Eastwood and Peacock 1976). However, the bimodal distribution in females was not confirmed in other studies (Ho et al. 1997, Yip et al. 1998).

Absence of seasonality was found in Los Angeles and Sacramento counties in the 1970s (Tietjen and Kripke 1994).

Violent suicides have been shown to occur mainly in the spring (Massing and Angermeyer 1985, Maes et al. 1993a, Hakko et al. 1998, Preti and Miotto 1998) or in the autumn (Lester and Frank 1988). Seasonality has less commonly been found for non-violent suicides with peaks only (Massing and Angermeyer 1985) or also (Hakko et al. 1998) in the autumn.

The distribution of suicide during the week was shown already by De Gerry in 1835 (Massing and Angermeyer 1985). A peak was found on Monday (Sunday among the Jews in Israel). In a more recent review 11/14 studies (Massing and Angermeyer 1985) showed highest rates on Mondays. The other studies showed peaks on Sundays or Tuesdays.

Although seasonality of suicide has been extensively studied, investigations into the monthly distribution of suicide among depressed patients has, to my knowledge, not been performed. The present study deals with a

sample of well-investigated depressed patients who had received a prospective diagnosis of severe depression/melancholia. The following questions were addressed: Is there a monthly distribution of suicide in severely depressed patients? If so is the distribution related to the monthly onset of depression? Is suicide more common during any certain day of the week?

Material and method

The sample

Between 1949 and 1956, the Senior Psychiatrists at the Department of Psychiatry, University Hospital of Lund, rated all their inpatients at discharge on a multidimensional diagnostic schedule developed by Essen-Möller and Wohlfart (1947). The item severe depression/melancholia was used from 1956, and all patients with that diagnosis have been followed up regarding mortality in two sessions to Jan 1, 1984 (Berglund and Nilsson 1987) and to Jan 1, 1998 (Brådvik and Berglund 2001). A validation against DSM IV (American Psychiatric Association 1994) for a subsample of 178 patients (Brådvik and Berglund 2000) revealed that, on a long-term scale, at least 91 % of the patients met the criteria for major depressive disorders with melancholic or psychotic features.

Altogether 1206 patients (506 men and 700 women) received the diagnosis severe depression/melancholia at discharge during 1956–1969. The patients were followed up by means of the general population register and the local parish registers. Deceased persons were grouped according to the primary cause of death as classified by the Central Bureau of Statistics using the International Classification of Disease (1968, 1987). These procedures have previously been described (Berglund and Nilsson 1987, Brådvik and Berglund 2001).

At the first follow-up 103 patients had committed suicide and another 11 at the second. Patients with secondary depressions had been excluded at first follow-up (Brådvik and Berglund 1993), leaving 89 suicides with a primary depression.

A research assistant prepared the case records of the 11 more recent suicide victims and excluded two secondary depressions (one with a primary diagnosis of alcoholism and one with an organic brain syndrome). Thus, finally 98 suicide victims with a diagnosis of primary severe depression/melancholia (44 men and 54 women) were accepted for the present study. The monthly distribution of suicide was investigated for these patients. Suicide on the different days of the week was investigated for 43 men and 53 women (the date of death was not known for two patients). The month of onset of the depressive episodes was compared for the first 89 suicides who had controls. (The number of patients who sometimes had had an onset of an episode during each month was scored) Finally, the onset of the depressive episodes was related to the time of suicide for the total period.

Fifty (22 men and 28 women) out of the 98 patients were in contact with the clinic within six months before the suicide, and for those data concerning treatment, life events, etc., relevant at the time of suicide were available.

Statistics

The differences between proportions were compared with chi-square tests. The peaks were compared to the remaining sample and significant correlations within the remaining sample excluded. Spearman's rank correlation was used for a comparison between depressive episodes among suicides and controls. The rank correlation was further tested with chi-square tests. The column with the higher frequencies was adjusted to the one with the lower by making one row equal and excluding that row before the calculation. (Thus, the ranks were preserved and significant results due to higher frequencies avoided). When expected frequencies were small, cells were combined into quarters of the year.

Results

The monthly distribution of suicide

The frequencies of suicide during different months are presented in Table 1. The frequency of suicide in October/November significantly exceeded the other months of the year for the total sample and for the male group separately. (Correction has been made for number of days per month and leap years) However, there was no significant peak in the female group.

Suicide related to days of the week

The distribution of suicide on different days of the week is presented in Table 2. There was a significant overrepresentation of suicides on Sundays for both sexes and for each sex separately. None of the Sunday suicides occurred when on leave. Thus reduced supervision was not a confounding factor.

Table 1 Frequencies of suicide during different months of the year

	Both sexes n = 98	Men n = 44	Women n = 54
January	6	0	6
February	5	3	2
March	7	4	3
April	8	4	4
May	8	2	6
June	6	3	3
July	8	3	5
August	9	4	5
September	4	1	3
October	17	10	7
November	12	8	4
December	8	2	6

October/November:
Both sexes: $\chi^2 = 11.71$ (df = 1); $p < 0.01$
Men: $\chi^2 = 15.76$ (df = 1); $p < 0.001$
Women: $\chi^2 = 0.52$, non-sign

Table 2 The distribution of suicide during the days of the week

	Both sexes n = 96	Men n = 43	Women n = 53
Monday	13	9	4
Tuesday	15	7	8
Wednesday	8	4	4
Thursday	12	5	7
Friday	9	3	6
Saturday	9	4	5
Sunday	30*	11*	19*

Both sexes: $\chi^2 = 22.58$ (df = 1); $p < 0.001$
Men: $\chi^2 = 4.49$ (df = 1); $p < 0.05$
Women: $\chi^2 = 20.31$ (df = 1); $p < 0.001$

Method of suicide

There was no relation between violent method and seasonality of suicide, according to the common definition "all but drug intoxications and superficial wrist-cuts" (Träskman-Bendz et al. 1981). Non-violent suicide, however, was rare in the male group (11 %).

There was no difference in the frequencies of violent suicide during the different days of the week.

Socio-economic factors and treatment

There was no significant correlation between age, social class, or marital status and the seasonal distribution of suicide. Occurrence of life event and previous suicide attempts showed no significant associations either. Nor were adequate somatic treatment and improvement significantly related.

There were no significant correlations between these factors and suicide on days of the week.

The monthly distribution of depression

A comparison between the onset of depressive episodes in suicides and controls for the original sample of 89 suicides is shown in Table 3. There was a weak correlation and no significant difference.

The onset of depressive episodes and occurrence of suicide in men is presented in Table 4. There is no correlation but a significant difference in the occurrence of suicide and depression.

A seasonal pattern of depression was not very common. It was not more frequently shown among male patients who committed suicide in October/November (2/18 vs 3/26). Nor was onset of depression in October/November more common in these patients (6/18 vs 8/26).

Table 3 The occurrence of depression in suicides and controls, related to months of the year

	Suicides Both sexes n = 89	Controls Both sexes n = 89	Suicides Men n = 38	Controls Men n = 38
January	24	19	6	2
February	23	14	10	6
March	21	21	8	7
April	20	15	7	5
May	25	19	8	7
June	26	14	15	5
July	25	16	8	6
August	23	24	9	11
September	25	19	14	5
October	30	32	9	13
November	25	19	6	4
December	27	25	10	11

Both sexes (n = 89): Spearman $\rho = 0.321$; $\chi^2 = 11.39$ (df = 11) $p < 0.50$
Men (n = 38): Spearman $\rho = 0.370$; $\chi^2 = 10.96$ (df = 11) $p < 0.50$

Table 4 The occurrence of suicide related to onset of depression in male suicides

	Suicide in men (n=44)	Onset of depression in male suicides (n=44)
January	0	6
February	3	11
March	4	9
April	4	8
May	2	8
June	3	15
July	3	9
August	4	10
September	1	17
October	10	10
November	8	7
December	2	11

Spearman $\rho = -0.054$; $\chi^2 = 7.97$ (df = 3); $p < 0.05$

Out of those male suicides who were followed until their last depressive episode, there were 3/9 who died early in the course of depression in October/November vs. 5/13 during the other months. Thus, the suicides occurred about equally late in the course.

Other diagnostic considerations

The distribution of suicide by month or day was not different among patients who developed a bipolar disorder or showed psychotic features. Nor were recurrence, remission, chronicity, and rapid cycling related. Course of depression such as number of episodes and length of follow-up did not discriminate either.

Discussion

The sample

The present study deals with a fairly large sample of patients with severe depression/melancholia who had prospectively been rated on a multiaxial schedule and been followed for 29–42 years after their first admission with this diagnosis. The agreement with DSM IV appears to be high with at least 91 % fulfilling the diagnostic criteria for major depressive disorder with melancholic or psychotic features (Brådvik and Berglund 2000).The homogeneity was increased by the exclusion of secondary depressions, mainly alcoholism, which reduced the comorbidity.

It might be questioned whether there is a similar chance to commit suicide late in the year as patients entered the study continuously between 1956–1969. Thus, the chance might be higher late in the year when more patient had entered. Still, the pattern persists after 1969, when all patients have been included in the sample. Moreover, patients may be dead later in the year, which diminishes the chance of suicide then. Thus there is probably not a systematic error that may effect the result.

Main findings

A peak of suicide in November/October was shown for severely depressed men. This peak coincides with the second peak in the autumn not infrequently found in earlier studies (Massing and Angermeyer 1985, Eastwood and Peacock 1976). This second peak in the autumn may include severely depressed men, who encompass a subgroup of all male suicides. However, there was no spring peak in the present study.

There was no correlation between the monthly onset of depressive episodes and suicide. A bimodal seasonal distribution of severity of depression (Maes et al. 1993b) and a biochemical marker L-tryptophan (Maes et al. 1995) has also been shown. Further, a coincidence between depression and suicide has been shown, but earlier studies did not deal with suicide rates in depressed samples (Eastwood and Peacock 1976, Parker and Walter 1982, Maes et al. 1993b). A possible explanation for the present finding is that suicide is probably not carried out immediately following the onset of depression. There have been two broad explanations of seasonality of suicide: the bioclimatic and the socioeconomic (Chew 1995). The present findings may indicate that whatever the factor that causes suicide it may do so in patients who already are depressed.

No significant peaks of the monthly distribution of suicide could be shown in the female group.

There was a peak on Sundays in both groups. Other studies have mostly shown peaks on Mondays (Massing and Angermeyer 1985), but they do not deal with severely depressed patients specifically. One possible explanation is that low activity or being at home on Sundays may increase inner tension. No socio-economic factor could be related in the present study. This finding is, however, uncertain due to the small number of observations.

Conclusion

The present study shows a peak of suicide in October/November among men with a severe depression/melancholia. This peak is deviant from the generally shown spring peak in suicide but coincides with a second peak in the autumn, which has sometimes been found. There was no correlation with the monthly distribution of onset of depression. There was a peak of suicide on Sundays for both sexes.

Acknowledgments This study was supported by grants from Swedish Medical Council, the Sjöbring Fund, and the O. M. Persson Fund. Anna Lindgren, Mathematical Statistics, Centre of Mathematical Sciences, Lund University, provided statistical advice.

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