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ORIGINAL PAPER

Suicide rate in schizophrenia in the Northern Finland 1966 Birth Cohort

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Abstract
Background Suicide rate among schizophrenia patients may vary for several reasons, one of the most important being the time point of the suicide during the illness process. However, prospective studies on suicide risk in population-based cohort of individuals with new-onset schizophrenia have been lacking.
Method The data were collected for 10,934 individuals alive in Finland at the age of 16 from the genetically homogenous, population-based Northern Finland 1966 Birth Cohort ascertained already during mid-pregnancy. The Finnish Hospital Discharge Register was used until the end of 1997 (age 31) to identify cases with mental disorder. Case records were scrutinized and diagnoses were re-checked for DSM-III-R criteria. One hundred subjects met the DSM-III-R criteria for schizophrenia. Deaths by the end of year 2005 (age 39) were ascertained from death certificates.
Results Suicides ($n = 7$) accounted for 50% of all the deaths at age from 16 to 39. Seven (7.0%) subjects with schizophrenia had committed suicide; suicide rate being 2.9% (1/35) for women and 9.2% (6/65) for men. Furthermore, 71% of suicides in schizophrenia occurred during the first 3 years after onset of illness.
Conclusion The suicide rate for patients with new-onset schizophrenia followed until the age of 39 was high and accounted for half of the deaths. Great majority of the suicides took place during the first years of the illness.

Keywords Schizophrenia · Suicide · Mortality · Cohort studies

Dr Wayne Fenton deceased in September 2006 during the writing process of this manuscript. He gave the original idea for this article and participated in writing the first drafts.

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Introduction

The view of suicide rate among subjects with schizophrenia has changed in the past few years. In their recent meta-analysis of suicide risk in schizophrenia Palmer et al. [14] concluded that the lifetime risk of suicide in this disorder is 4.9%. This is less than half of the 10–13% reported in the review by Caldwell and Gottesman [2]. Also Heila and Lonnqvist [8] recently suggested that the previous estimate may have been too high. Several reasons may have accounted for this overestimation.

Of particular interest is the strong relationship between characteristics of study sample and the observed suicide rate in the meta-analysis of Palmer et al. [14]. For example, the estimated lifetime suicide rate was nearly three times greater in follow-up studies on first-admission patients (5.6%) than on patients at various points of illness (1.8%). Largely derived from consecutive patients enumerated in clinics and hospitals, wide variation in both proportionate mortality and case fatality was, however, reported across the 32 studies included in the meta-analysis. Palmer et al. [14] argued that first-admission and new-onset studies estimate suicide risk more accurately because they include the very first years of the illness when death by suicide is most likely.

Pompili et al. [16] recently reviewed the time point of suicide [16]. Most suicides occurred in the early phase of schizophrenia [10, 11, 19], after acute discharge or between exacerbations [4, 12]. However, suicide risk is elevated during the whole course of illness [7]. Findings demonstrate that suicides committed at different points of the illness course, may differ according to causative motive. While acute phase suicides most probable are a direct consequence of psychosis (e.g. paranoia, hostility, erroneous insight), suicides following acute discharge or committed a variable time period after discharge are mostly related to symptoms of depression [12].

Thus, the risk factors for suicide in schizophrenia may vary during the course of the illness. According to a recent meta-analysis [5], strong risk factors for suicide in schizophrenia are previous depressive disorders (OR = 3.03), previous suicide attempts (OR = 4.09), drug misuse (OR = 3.21), agitation or motor restlessness (OR = 2.61), fear of mental disintegration (OR = 12.1), poor adherence to treatment (OR = 3.75) and recent loss (OR = 4.03). Still, long-term prospective research on patients with new-onset schizophrenia is needed to verify the overall suicide risk as well as to identify the risk factors specific for the different course of the illness.

We supposed that the most accurate estimate of suicide risk in schizophrenia can be derived from the prospective population-based cohort. In the genetically homogenous Northern Finland 1966 Birth Cohort four out of 51 (7.8%) male, but none of the 25 female schizophrenia patients had died from suicide by the end of the year 1994 (age 28) [18]. In the present study, data collection of the same cohort was extended up to 2005. The aim was to study the suicide rate until the age of 39 and to analyse in which phase of the illness suicide most likely occurs.

Methods

Subjects of the study

The Northern Finland 1966 Birth Cohort Study is an unselected, general population birth cohort ascertained during mid-pregnancy. The cohort is based upon 12,068 pregnant women and their 12,058 live-born children. The data used here were collected prospectively for 11,017 individuals alive in Finland at the age of 16. In the field survey conducted in 1997 a total of 83 individuals did not consent to the use of their data and were excluded, leaving 10,934 cohort members for the present study. Permission to gather data was obtained from the Ministry of Social and Health Affairs. The study protocol was approved in 1996 and has been reviewed since by the Ethics Committee of the Faculty of Medicine of the University of Oulu.

Diagnostic data

The Finnish Hospital Discharge Register (FHDR) covers all mental and general hospitals and health centres nationwide. Until recent years, a vast majority of (86%) patients in Finland who experienced an episode of schizophrenic psychosis were hospitalized and appear in the FHDR [1]. All cohort members over 16 years of age appearing on the FHDR until the end of 1997 for any mental disorder (i.e. ICD-8 290–309, DSM-III-R diagnoses 290–316, and ICD-10 F00–F69, F99) were identified. All case records were scrutinized and diagnoses were rechecked for DSM-III-R criteria. A more detailed description of the diagnostic validation is presented elsewhere [9, 13]. Altogether 155 subjects with known psychotic episodes in their life up until the age of 31 were detected. One hundred subjects met the DSM-III-R criteria for schizophrenia (295, except 295.4 and 295.7). The group with non-psychotic psychiatric diagnoses included 322 subjects.

Mortality data

Information about deaths and the causes of death by the end of year 2005 was ascertained from death certificates from Statistics Finland. The causes of death were coded according to ICD-9 before the year 1996 and according to ICD-10 from 1996 onwards. The subjects were classified into two groups: suicide (ICD-10: X60–X84, Y87.0, ICD-9: E950–E959) and other causes of death, or alive. Validated diagnoses at the end of 1997 and mortality data at the end of year 2005 gave a minimum of 8-year follow-up after the onset of illness for each schizophrenia patient.

Results

At the end of the year 2005 (age 39) 7 of 100 subjects with schizophrenia had committed suicide. Thus, their case fatality rate (number of suicides divided by number of subjects) was 7%, for women 2.9% (1/35) and for men 9.2% (6/65). Seven men and none of the women with schizophrenia died from a cause other than suicide. Thus, proportionate mortality rate (number of suicides/number of deaths) is 50% for all subjects with schizophrenia. Furthermore, 71% of suicides in schizophrenia occurred during the first 3 years after onset of illness.

Figure 1 shows survival curves for suicide after first psychiatric discharge for schizophrenia and non-psychotic psychiatric patients. Suicide rate of schizophrenia patients was nearly twofold higher (3.1 vs. 6.0%, OR = 2.0; 95% CI 0.7–5.6, $P = 0.17$, statistically non-significant) within 6 years after the first discharge from psychiatric care compared to hospital-treated patients with non-psychotic psychiatric diagnoses (number of suicides 14). When comparing survival curves the difference was statistically significant (Log Rank = 7.74, $df = 1$, $P = 0.0054$).

Discussion

In our population-based cohort the case fatality rate in new-onset schizophrenia was 7% by the age of 39. Suicide risk was high especially for men and in the early phase of the disease. Two-thirds of suicides occurred within 3 years after onset of illness. Altogether, suicides accounted for half of the deaths during the follow-up.

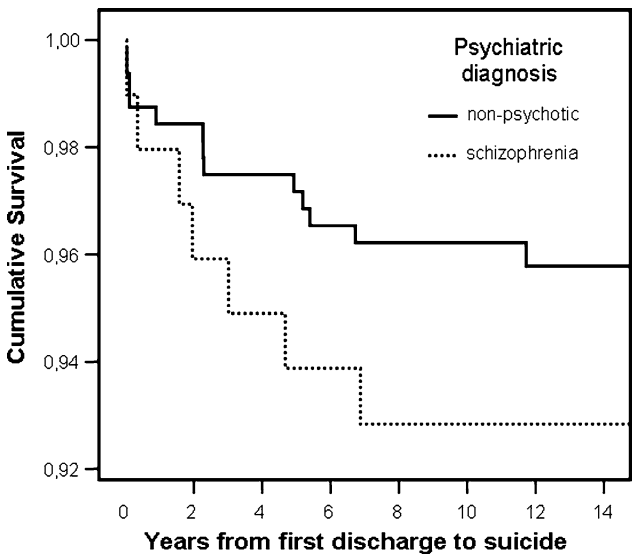

Fig. 1 Cumulative survival for suicide in schizophrenia ($n = 100$) and in non-psychotic psychiatric diagnoses ($n = 322$) in the Northern Finland 1966 Birth Cohort

To our knowledge, this is the first report of suicide risk in a prospectively followed population-based cohort of individuals with schizophrenia. If one accepts that an epidemiologically based cohort provides the best estimate of suicide rate, then the meta-analysis of Palmer et al. [14], largely based on samples of convenience at various stages of illness, may under-estimate the lifetime risk of suicide in schizophrenia.

Although two-thirds of suicides in this sample occurred within 3 years of hospital discharge, other data suggest that suicide risk may remain high over the course of illness. A quite recent examination of all suicides of patients with schizophrenia in Finland over a 12-month period found that one-third (30/92) of schizophrenia suicide victims were over the age of 45 [7]. Thus, continued follow-up of the 1966 birth cohort will be useful in clarifying the trajectory of risk over the course of schizophrenic illness. While the whole lifespan data are lacking, data gathered until age 39 have now been reported in this study.

Constant monitoring of suicide rates in schizophrenia is essential also when evaluating the effects of new treatments. Suicide rate in schizophrenia had increased from less than 0.5% in 1875–1924 to 4.7% in 1994–1998 in North Wales [6]. This rise may be explained by deinstitutionalization and advanced psychopharmacology, which may improve patients' insight [6]. However, in contrast, a Finnish study comparing more contemporary suicide rates 1 year after discharge found that suicide risk in schizophrenia was greater in 1985–1991 than in 1995–2001 (RR = 1.26, CI = 1.17–1.36) [15]. Another Finnish study reported significantly reduced 5-year suicide mortality of first time hospitalized male schizophrenia patients in 1995–1998 when compared to people hospitalized 1980–1984 [17]. During this period there have been significant structural changes in Finland in mental health services downsizing inpatient care.

The diagnostic accuracy of suicide was high, since all injury deaths undergo forensic autopsy in Finland. The most accurate estimates of suicide rates can be made with birth cohort studies and first-admission patient studies [14]. In future studies it would be interesting to see how suicide rate and time point of suicide during schizophrenia process differ by gender and other specific subgroups of patients.

However, there are methodical challenges in these studies. We had validated diagnoses at the end of year 1997. Some of the suicide victims might have developed schizophrenia after that, and this may have slightly underestimated the risk of suicide in subjects with schizophrenia. Since our study, due to the relatively young adult age of the cohort, consisted mainly of early onset schizophrenia patients, generalization of our results to all schizophrenia patients should be done with caution. A small number of cases and limited statistical power can be

problematic, when focus is on a rare phenomenon such as suicide. This makes the estimation of specific suicide risks in subgroups impossible [3]. For these purposes, other study designs are needed. Together, however, population-based cohorts and patient samples provide a more complete picture of the suicide among subjects with schizophrenia.

Conclusion

The suicide rate for patients with new-onset schizophrenia followed until the age of 39 was high and accounted for half of the all deaths. Great majority of the suicides took place during the first years of the illness.

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