Risk of Suicide and Accidental Death among Subjects Visiting a Doctor because of Mental Disorder: A Matched Case-Control Study in Finnish Farmers

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Abstract: Risk of Suicide and Accidental Death among Subjects Visiting a Doctor because of Mental Disorder: A Matched Case-Control Study in Finnish Farmers: Jyrki Penttinen. Kuopio Regional Institute of Occupational Health—Background: Various mental disorders, especially depression, precede suicide. According to some authors, also victims of accidental death in many cases have suffered from mental problems. In most former studies the study design has been retrospective. In this prospective study the risk of suicide or accidental death among patients visiting a primary health care doctor was evaluated. Subjects and methods: 20 suicides, 24 accidental deaths and 176 controls (four matched controls for each case) were included in a cohort comprising 3,172 male farmers who were followed up for 13 yr. Results: Generally speaking, persons visiting a doctor because of some mental problem had a clearly increased risk of committing suicide: odds ratio (OR)=5.6; 95% confidence limit (CL): 1.7, 18.5. The corresponding OR for accidental deaths is 1.5 (95% CL: 1.1, 2.1) Alcohol abuse was the most usual mental disorder preceding suicide (OR=13.2, 95% CL: 1.4, 121) and accidental death (OR=10.9; 95% CL: 1.3, 91.4). Visits to the doctor because of depression preceded suicide in 5 of 20 cases. Not one of 80 controls of suicide cases had visited a doctor because of depression during the follow-up, so it was not possible to calculate the OR. Those having used psychotropical drugs during the follow-up had a 14.5-fold risk (95% CL: 3.1, 68.3) of dying from suicide and 3.8-fold risk (95% CL: 1.3, 10.3) of dying accidentally. Conclusions: Alcohol abuse is the most usual mental disorder associated with accidental death. Suicide is often preceded by alcoholism or depression. (J Occup Health 2001; 43: 107–110)

Key words: Farmer, Case-control study, Suicide, Accident, Mental disorder

A great many persons who committed a suicide or made a suicide attempt have a long history of mental disorder, especially depression and alcoholism1–4). Mental disorders, obviously partly due to suicidal tendency and partly due to the use of psychotropic drugs, are also associated with an increased risk of accidental death, at least when traffic accidents are considered5–8). In a recent study concerning the suicide pattern in England and Wales it was found that about 24 per cent of those who committed suicide had been in contact with mental health services during the year preceding death9). According a Finnish study victims of suicide often have been in contact with local health authorities but lacked appropriate therapy10). Those studies like most of the studies considering the behaviour of the victim preceding the suicide do not give any answer to the question of the relative risk of committing suicide among persons visiting the doctor because of various mental disorders. We studied the risk of violent death among Finnish male farmers having visited general practitioners because of mental disorders. Our hypothesis was that the risk of suicide or accidental death is significantly increased among those having visits because of mental disorders.

Subjects and Methods

The cases and controls were included in a cohort comprising 3,172 male farmers born between 1935 and 1958 in 14 Finnish municipalities. The subjects participated in a postal questionnaire in November 1979–January 1980. The follow-up began on 1 February 1980 and ended on 31 December 1992. The suicides and accidental deaths occurring during the follow up were checked from the copies of death certificates which were obtained from the Finnish Statistics Bureau. The death certificates include the cause of death. When suicide or accidental death is concerned, also a description of the
means of suicide and type of accident as well as the alcohol level in the blood is included in the death certificate. 26 suicides and 31 accidental deaths occurred during the follow up. The patient records of 9 cases were not found. Lack of patient records does not necessarily mean that a person did not visit a physician. The more probable explanation is that the records have been removed from the file room after the death. That is why cases with no patient records were excluded from the analysis. 4 cases were lacking suitable controls. For each of the remaining 44 cases, 20 suicides and 24 accidental deaths, four matched controls were selected.

The variables used in the analysis were date of birth (+/−3 yr), smoking habit (dichotomous variable), social status (three categories on the base of the size of the farm) and the county where the subject is living. The matched controls were selected randomly from the subjects responding on the base-line questionnaire. The information used in matching was also taken from the base-line questionnaire. The follow-up time of the case and corresponding controls began on 1 February 1980 and ended at the date of death of the subject. All the controls were alive at the date of death of the subject. The patient records for every selected subject were checked by a physician who visited all of 14 local communal health care units. The physician had a list of matched sets including names, identity numbers and time of death of the subject, which is the end of follow-up for both subjects and controls, but she was unable to recognize the subjects and controls before checking the patients’ records. The number of visits with mental disorders as well as some other specified disturbances as a primary cause and the information concerning the use of psychotropic drugs were checked against the patients’ records. The use of psychotropic drugs is associated with suicides and accidental deaths as follows: the OR is 14.5 (95% CL: 3.1, 68.3; p=0.0007) for suicides and 3.7 (1.3, 10.3; p=0.01) for accidents.

Alcohol abuse was involved in most accidental drownings and intoxications, but not in traffic or work site accidents. 12 of 24 victims of accidental death had used alcohol during the last few hours preceding death. The number of visits with mental disorders as well as some other specified disturbances as a primary cause and the information concerning the use of psychotropic drugs were checked against the patients’ records. The odds ratios (OR) and 95% confidence limits (CL) were calculated by a conditional logistic regression analysis in a matched case-control study (SAS® statistical package). The conditional logistic regression analysis is a stratified analysis, where each matched set is a stratum. Probability values of 0.05 or less were considered as statistically significant.

### Results

20 cases of suicide and 80 matched controls as well as 24 cases of accidental death and 96 controls were analysed separately. Detailed information concerning the visits to a doctor among subjects and controls is shown in Table 1 (suicides) and Table 2 (accidental deaths). The OR for committing suicide is 5.6 (95% CL: 1.7, 18.5; p=0.005) among subjects visiting a doctor because of any mental disorder. The corresponding risk rate for accidental death is 1.5 (95% CL: 1.1, 2.1; p=0.01). The OR for dying from suicide is 33.6 (95% CL: 4.2, 266; p=0.0009) and for dying accidentally 8.9 (95% CL: 2.3, 34.2; p=0.002).

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Alcohol abuse was involved in most accidental drownings and intoxications, but not in traffic or work site accidents. 12 of 24 victims of accidental death had used alcohol during the last few hours preceding death. The most usual type of accident was drowning (six cases). In five of these cases alcohol was found in the analysis of blood samples. Two of them had visited a doctor because of alcohol abuse. Five accidental deaths occurred in traffic, but alcohol was found in none of these victims. Neither had any of them visited a doctor because of alcoholism or any other mental disorder during the follow-

### Table 1. Number of suicides and controls (four matched controls for each case) having visited a doctor because of mental disorder during follow-up

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Suicide (N=20)</th>
<th>Controls (N=80)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Depression</td>
<td>5</td>
<td>25</td>
</tr>
<tr>
<td>Alcoholism</td>
<td>4</td>
<td>20</td>
</tr>
<tr>
<td>Insomnia</td>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>Psychotic disorder</td>
<td>3</td>
<td>15</td>
</tr>
<tr>
<td>Other</td>
<td>3</td>
<td>15</td>
</tr>
</tbody>
</table>

### Table 2. Number of accidental deaths and controls (four matched controls for each case) having visited a doctor because of mental disorder during follow-up

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Accidental deaths (N=24)</th>
<th>Controls (N=96)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Depression</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>Alcoholism</td>
<td>8</td>
<td>33</td>
</tr>
<tr>
<td>Insomnia</td>
<td>3</td>
<td>12</td>
</tr>
<tr>
<td>Psychotic disorder</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Other</td>
<td>1</td>
<td>4</td>
</tr>
</tbody>
</table>
Four of the accidental deaths were considered as work site accidents. As in traffic accidents, not in a single case was any connection between alcohol abuse or other mental disorder found. Carbon monoxide intoxication was the cause of death in three cases. In two victims alcohol was found in blood samples, all three had visited a doctor because of alcoholism during the follow-up. Two of the accidental deaths were due to drug intoxication and one to alcohol intoxication. One victim with drug intoxication had schizophrenia, and the other visited a doctor because of alcoholism during the follow-up. In two accidents the cause of death was hyperthermia, immediate previous alcohol use as well as visiting a doctor because of alcoholism during the follow-up occurred in both cases. The remaining case of accidental death was due to iodine intoxication, and no abuse of alcohol or any evidence of mental disease was found. Shooting (12 cases) and hanging (4 cases) were the most common means of committing suicide. Two victims committed suicide by taking an overdose of psychotropical drugs, one probably used dynamite and another one carbon monoxide. Alcohol in blood samples was found only in four persons committing suicide.

Discussion

Accidents and suicides are fairly rare events. In a prospective study the number of person years has to be quite high to reach a sufficient statistical power. In our cohort the number of person years was about 40,000 which appeared to be enough. In a study design including matched sets, the number of suitable controls was also a limiting factor. If we had continued the follow-up for some years we would have found some extra cases, but also would have had to reduce either the number of controls in the matched sets or the number of matching criteria. Thus only small, if any, improvent in the statistical power had occurred by increasing the follow-up time.

All the subjects included in this study had farming as their occupation. This is both an advantage and a disadvantage when the results are considered. The good thing is that occupation is not a confounding factor in this study. On the other hand the disadvantage is that taking care of health, for example alcohol consumption or contacting the communal health care for any reason, may be different in farmers when compared with other occupations.

The most important methodological shortcoming concerns the classification of the diagnoses. The classification is not as accurate as it should be, because it is only based on patients’ records. This might cause some bias in the results, especially when the importance of different risk factors is evaluated. Another limiting factor is lack of the information concerning mental disorders in the whole study population. The comparison of subjects visiting the doctor because of mental disorders with those with mental disorders but with no visits to the doctor would have been valuable.

By using the figures concerning cases and controls it is possible to roughly estimate that about 239 (44*0.46 + (3172-44)*0.07) persons visited a doctor because of some mental disorder during the follow-up. Among them 20 did commit suicide or died from an accident during the follow-up. Thus at least 8 per cent of patients with a diagnosed mental disturbance will die from suicide or accident sooner or later. Doctors handling primary health care have seen almost every second victim of suicide or accidental death. Alcoholics seem to have the greatest risk of dying accidentally or from suicide. According to a rough estimation about 100 persons visited a doctor because of alcoholism during the follow-up. 8 of them died by accident and 4 committed suicide during the follow-up. A primary care doctor had diagnosed alcoholism in 7 of 12 persons having used alcohol during the few hours preceding a fatal accident. Primary care physicians may be more successful in preventing alcoholism-related suicide and accidental death. Subjects with mental disturbances will be a great challenge to the primary health care system in the future. It is obvious that doctors working in primary health care should spend more time on discussions with patients suffering from mental problems to recognize those with most pronounced risk of violent death. In terms of administration we have to devote more resources to taking care of patients with mental disorders. By effectively taking care of persons with severe depression it is possible to reduce the risk of suicide\(^1\). According to our results the prescription of psychotropical drugs to as many as possible seems not to be enough. The use of psychotropic drugs did not greatly decrease the risk of suicide or accidental death, but we do not know if the use of psychotropic drugs immediately precedes suicide or accident. According to a Swedish study only 16% of the victims of suicide had appropriate medication preceding the suicide\(^2\). According to this present study a more active role of primary health care in taking care of subjects with mental disorders is needed, but the possibility cannot be ruled out that the risk of suicide or unintended injury is higher in people with mental disorders not visiting a doctor during the follow-up. We do not have data relating to mental disorders with various types of care received among the study population. Further efforts are therefore needed to evaluate the risk of accidental death and suicide among people with mental disorders and with or without a visit to a primary health care doctor.

In conclusion, suicide is a probable cause of death among persons visiting a doctor because of depression or alcoholism. Alcohol abuse is also related to accidental death, especially drowning and carbon monoxide intoxication, as a preceding and an immediate cause. Alcohol is found in the blood of most victims of drowning.
accidents and those with carbon monoxide intoxication. On the other hand traffic and work site accidents do not seem to be related to immediate alcohol abuse or to preceding visits to a family doctor because of mental disorders.

References