An Analysis of Ambulance-transported Cases of Attempted Suicide in 3 Prefectures (Akita, Aomori, and Iwate) in the Northern Tohoku Area in Japan

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Abstract

A survey was conducted on the 2,556 patients who attempted suicide and were transported via ambulance during the period from 2003 to 2004 in 3 prefectures in the northern Tohoku area. The mean age of the patients was 47.2 ± 19.1 years (49.3 ± 17.8 for males and 44.8 ± 20.3 for females). The most common method of suicide was by hanging (261 cases in Akita, 229 in Aomori, and 312 in Iwate), followed by overdosing and self harm by means of cutting or stabbing. Depression was the most common underlying mental disorder (116 cases in Akita, 95 in Aomori, and 91 in Iwate), followed by schizophrenia, neurosis, and psychogenic reaction. The method of suicide resulting in the highest death rate was by hanging (74.9% in Akita, 68.8% in Aomori, and 68.8% in Iwate). Public education and other actions in society at large are essential for the prevention of suicide. Considering the need for detecting a depressive state foreboding suicide attempts and also for preventing repeated attempts, both psychiatrists and primary physicians in the community should be proactively involved in the issue of suicide.

Key words  Suicide, Northern Tohoku, Suicide prevention

Introduction

In September 2004, the World Health Organization (WHO) alerted the world with the message stating: “Suicide is a huge but largely preventable public health problem, causing almost half of all violent deaths and resulting in almost one million fatalities every year, as well as economic costs in the billions of dollars.” Japan has also been experiencing a rapid increase in deaths from suicide since 1998.1 Three prefectures in the northern Tohoku area (Akita, Aomori, and Iwate) have been recording particularly high suicide death rates. The rates per 100,000 population in 2004 were 39.1 in Akita, 38.3 in Aomori, and 34.6 in Iwate.1 These statistics refer to deaths from suicide, and there are actually many more cases of attempted suicide. We previously conducted a questionnaire survey with fire departments in Akita prefecture and reported the occurrence of suicide attempts in the prefecture.2 Expanding this study approach, we next conducted a study covering the 3 pre-
fectures in the northern Tohoku area, where the problem of suicide is particularly remarkable among the regions in Japan. We examined the characteristics of ambulance-transported cases of suicide attempts in the 3 prefectures, and provided some discussion concerning the measures for preventing suicide.

**Subjects and Methods**

Fire departments in Akita, Aomori, and Iwate prefectures (43 departments in total) were asked to participate in the questionnaire survey. The scope of study was the period of 2 years from January 1, 2003 to December 31, 2004. Information concerning age, sex, injury (method, place, and time), presence or absence of mental disorders, and the fatality of the act was collected. As for the definition of suicide, cases satisfying at least one of the following criteria from 1) to 4) were considered to have attempted suicide: 1) The patient stated that he/she had attempted suicide. 2) There was a suicide note or the patient had given an advance notice of death. 3) There was a witness observing the conduct of the act of suicide. 4) Although none of the above was noted, the mechanism of injury was unnatural in view of the situation and at least 2 of the following conditions were observed: (1) the patient had suicidal tendencies; (2) the patient had a history of suicide attempts; (3) the patient had a history of mental illness, the patient was receiving treatment for mental illness, or another person testified the presence of obvious mental symptoms; and (4) there was a clear trigger or a definite motive.

According to ICD-10, the method of suicide attempt was classified into (1) to (11) as follows: (1) drugs, (2) pesticides, (3) gassing, (4) jumping in front of a moving vehicle, (5) jumping from height, (6) cutting and stabbing, (7) hanging, (8) drowning, (9) firearms, (10) self-burning, and (11) other. Mental disorders were diagnosed at the hospital accepting the patient, and were classified into (1) to (7) below according to DSM-IV: (1) schizophrenia, (2) manic-depressive psychosis, (3) neurosis and psychogenic reaction, (4) toxic psychosis and substance dependence, (5) epilepsy, (6) organic brain syndrome, (7) other.

In some cases, additional information concerning the course of treatment was obtained through hearing from the hospitals accepting the patients. Due attention was paid in this process to ensure the protection of the patient’s privacy.

The data were expressed as mean ± S.D. Statistical analyses were based on the Student’s t-test for comparison between 2 groups and the χ² independence test for comparison among 3 prefectures. A difference with $P<0.05$ was considered significant.

### Table 1 Number of suicides, suicide rate, and mean age in 3 prefectures in northern Tohoku (Akita, Aomori, and Iwate)

<table>
<thead>
<tr>
<th></th>
<th>Suicides</th>
<th>Suicide rate (per 100,000 pop.)</th>
<th>Age (Years)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Akita</td>
<td>M 418</td>
<td>38.3</td>
<td>49.4±17.5</td>
<td>0.0241</td>
</tr>
<tr>
<td></td>
<td>F 362</td>
<td>29.6</td>
<td>46.4±20.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total 780</td>
<td>33.7</td>
<td>48.0±19.0</td>
<td></td>
</tr>
<tr>
<td>Aomori</td>
<td>M 428</td>
<td>31.7</td>
<td>48.8±17.9</td>
<td>&lt;0.0005</td>
</tr>
<tr>
<td></td>
<td>F 382</td>
<td>25.1</td>
<td>44.2±19.7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total 810</td>
<td>28.1</td>
<td>46.7±18.9</td>
<td></td>
</tr>
<tr>
<td>Iwate</td>
<td>M 518</td>
<td>39.3</td>
<td>49.6±18.1</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td></td>
<td>F 448</td>
<td>31.2</td>
<td>44.1±20.6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total 966</td>
<td>34.7</td>
<td>47.0±19.5</td>
<td></td>
</tr>
<tr>
<td>Total of 3</td>
<td>M 1,364</td>
<td>36.3</td>
<td>49.3±17.8</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td></td>
<td>F 1,192</td>
<td>28.5</td>
<td>44.8±20.3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total 2,556</td>
<td>32.2</td>
<td>47.2±19.1</td>
<td></td>
</tr>
</tbody>
</table>
Results

Answers were obtained from all 43 fire departments.

Cases

There were 2,556 cases identified in this study (1,364 males and 1,192 females). The mean age of all cases was 47.2 ± 19.1 years: 49.3 ± 17.8 for males and 44.8 ± 20.3 for females. The mean age of male cases was significantly higher than that of female cases ($P < 0.0001$). All 3 prefectures showed the same tendency in this respect (Table 1). The rate of suicide attempt cases per 100,000 population was 33.7 in Akita, 28.1 in Aomori, and 34.7 in Iwate (Table 1). The age distribution showed a peak in the 40–59 age bracket among males and in the 20–39 age bracket among females (Fig. 1).

Method of suicide

Hanging was the most common method of suicide in all prefectures, followed by drugs and then by cutting and stabbing (Fig. 2).

Disease classification

The percentage of cases diagnosed as having mental illness at initial examination was 34.43% in Akita, 24.11% in Aomori, and 30.15% in Iwate, and the differences were significant ($P < 0.0001$, Table 2). Depression was the most frequent diagnosis (42.9% in Akita, 47.9% in Aomori, and 30.9% in Iwate), followed by schizophrenia (7.7% in Akita, 8.0% in Aomori, and 11.9% in Iwate) and neurosis (11.4% in Akita, 5.0% in Aomori, and 8.1% in Iwate). These represented more than a half of all cases (Fig. 3).

Death rate

The death rate among suicide attempters was 34.5% in Akita, 35.5% in Aomori, and 39.7% in Iwate, and the differences were significant ($P = 0.0471$). As seen by the method of suicide, the death rate was overwhelmingly high with hanging (74.9% in Akita, 68.8% in Aomori, and 68.8% in Iwate), followed by gassing (11.1% in Akita, 10.3% in Aomori, and 14.2% in Iwate). The rates associated with other methods remained in the range of several percent.

Occurrence by the hour of the day and by the month

The occurrence of suicide attempts by the hour of the day started to increase at 6 a.m., corresponding to the increased activity of people, and
was low during the period after 20:00, at midnight, and before dawn. As seen by the month, there were about 70 cases of suicide attempts in each month, showing no accumulation in particular months.

Involvement of alcohol
The percentage of suicide attempters using alcohol in some form before the conduct was 13.9% in Akita, 8.16% in Aomori, and 10.6% in Iwate, and the differences were significant ($P=0.0013$, Table 2).

**Discussion**

Suicide is a major social problem. While the annual number of deaths from suicide in Japan has remained around 30,000 for several years, 3 prefectures in the northern Tohoku area (Akita, Aomori, and Iwate) have been ranked high in the suicide death rate for 3 years since 2002. According to the Vital Statistics of Population, the suicide rate per 100,000 population in 2004 was 39.1 in Akita, 38.3 in Aomori, and
In the present study, the suicide rate was lower than the suicide death rate presumably because the study covered only the cases that were ambulance-transported after suicide attempts. The age distribution of suicide attempters showed a peak in the 40–59 age bracket among males and in the 20–39 age bracket among females. Although the peak in the age distribution of suicide was observed in the older age bracket in the past, the peak is now tending to move toward younger ages. While depression has been identified as a risk factor responsible for the high suicide rate among aged persons, recent tendencies suggest the increase in young and middle-aged persons who attempt suicide because of economic hardships of life resulting from unemployment and prolonged recession, as well as the increase in young persons committing suicide because of difficulty in solving human relation problems.

The most common method of suicide was by hanging, as is the case in the national statistics. Suicide by hanging tends to be conducted impulsively, because it can be done without special preparation. When death rates were compared by the method of suicide, hanging resulted in the death of the person at an overwhelmingly higher rate than other methods. This may be explained by the fact that suicide by hanging is usually conducted in concealed places and a long period of time is elapsed before discovery. Therefore, it is important to take care so that a person showing signs of suicide should not be left alone. Although jumping from height is the 2nd most common method of suicide in Japan, this method was rare in this area, reflecting the scarceness of high-rise buildings in the 3 prefectures in the northern Tohoku area.

About 30% of the cases had mental disorders, and the most common underlying disorder was depression. A survey conducted overseas has shown that 90% of the cases examined at hospitals after suicide attempts had at least one mental disorder, and a majority of them had depression. Generally speaking, many suicide attempts are in a psychological condition such as a depressive state before committing suicide, often accompanied by loss of appetite, insomnia, and general deterioration of physical condition. Persons who are going to commit suicide often visit medical services such as internal medicine clinics because of this reason, and hence there is a need for intervention to prevent suicide at this stage, i.e., treatment of depression. Despite this need, the 3 prefectures in the northern Tohoku area are not provided with a sufficient number of physicians, and the availability of medical services is unevenly concentrated in
urban areas. In addition, initial care for the patients attempting suicide is mostly provided by general internists and surgeons rather than psychiatrists. In this respect, actions should be taken to disseminate the knowledge concerning the nature and treatment of depression to general physicians, who are likely to take part in emergency medicine.

In the present study, the use of alcohol in some form was associated with suicide attempts in about 10% of cases. Since Borges et al.\(^6\) reported that 35% of cases consumed alcohol within 6 hours before suicide attempts, the actual rate of alcohol use in our study might have been much higher than reported. While a moderate drinking habit does not affect the mortality index, heavy drinking has been associated with a significantly high occurrence of deaths from suicide.\(^7\) The fact that the 3 prefectures in the northern Tohoku area are ranked the highest in the men’s drinking index among the prefectures in Japan\(^8\) suggests the possibility that the high prevalence of a drinking habit may be contributing to the high suicide rate. Therefore, improvement of drinking habits is also essential for the prevention of suicide.

Although Akita prefecture remains in the dishonorable position of recording the highest suicide rate in Japan, efforts to reduce suicide have been continued, including meetings involving not only psychiatrists, but also persons from various fields, and the suicide prevention campaign starting in 2001 resulted in a 27% decrease in the suicide rate for 3 years. The number of deaths from suicide has also decreased in 2 successive years. However, it is undeniable that the number of suicides is still high. While suicide prevention should be achieved through the 3 stages of prevention, intervention, and postvention, the role of emergency medicine mostly resides in the intervention stage. The ongoing efforts toward effective suicide prevention require activities to educate the general public, to improve the understanding and recognition of suicide on the part of health care workers, and above all, to provide guidance and treatment for potential suicide attempters.

Acknowledgements

We express our sincere thanks to all the fire departments of municipalities in Akita, Aomori, and Iwate prefectures and department of general-affairs in Iwate prefecture, as well as the physicians at central hospitals, for their cooperation in this study.

References