

## Suicide and suicidal behavior among young people in a suburban area of Tokyo: association with clinical characteristics and antidepressants

Masami Inui-Yukawa,<sup>1</sup> Kenji Yamamoto,<sup>1,2</sup> Seiichi Tatematsu,<sup>4</sup> Shingo Miyaji,<sup>1</sup>  
Ayako Ide,<sup>2,3</sup> Yumi Iwamitsu,<sup>4</sup> Hitoshi Miyaoka<sup>1</sup>

<sup>1</sup> Department of Psychiatry, Kitasato University School of Medicine

<sup>2</sup> Department of Psychosomatic Emergency Medicine and Clinical Toxicology, Kitasato University School of Medicine

<sup>3</sup> Department of Emergency and Critical Care Medicine, Kitasato University School of Medicine

<sup>4</sup> Department of Medical Psychology, Graduate School of Medical Science, Kitasato University

**Objective:** The objective of this study was to investigate the tendency of young Japanese suicidal patients and to clarify the association with clinical characteristics and antidepressants.

**Methods:** A retrospective study was conducted on 1,086 suicidal patients (202 young patients, 12-24 yo, 781 middle aged patients, 25-64 yo, 103 elderly aged patients, 65-99 yo) at the Kitasato University Hospital Emergency Medical Center between January 2006 and December 2010.

**Results:** In the young group, the fatality ratio was 25.4% in males and 8.4% in females, and poisoning was the most common suicide method. Poisoning and history of suicide attempts were significantly higher in patients undergoing therapeutic treatment with antidepressants. There were no significant differences between the selective serotonin reuptake inhibitor (SSRI)-treatment group and the non-SSRI-treatment group.

**Conclusions:** The reason the suicide fatality ratio was highest in the young group was most likely because subjects younger than 20 years old had significantly more problems with school and education. The clinical characteristics corresponded to past reports, but more detailed and accumulated investigations are required to further clarify the causal associations with clinical characteristics and antidepressants. In many cases, there were problems unique to young people in the backgrounds of their attempted suicides; and suicide prevention must, therefore, be conducted by working with educational faculties and institutes.

**Key words:** young people, suicide, suicidal behavior, emergency center, antidepressant

### Introduction

According to statistics from the National Police Agency of Japan, the number of suicides in Japan in 2011 was 30,651, with the serious condition of the number of suicides exceeding 30,000 yearly for 14 years since 1998. Among these, the number of suicides of young people such as "students and scholars," increased to 1,029 from the 928 in 2010, exceeding 1,000 for the first time since the commencement of taking statistics in 1978.<sup>1</sup> Since 1998, in which the yearly number of suicides exceeded 30,000, suicides among young people in their teens and twenties also increased, increasing to 720 from the 469 suicides in 1997 among people in their teens and

to 3,472 from the 2,534 suicides among people in their twenties. Signs of improvements have not been observed in the increasing tendency of suicides among young people, with the fatality rate for suicides also on the rise due to the effect of declining birth rates in Japan.

Moreover, regarding ranking of the cause of death due to "suicide" in young people in their teens to thirties, according to the vital statistics of the Ministry of Health, Labor and Welfare of 2009, "suicide" was ranked 3rd place in the class of 10 to 14 years old, and ranked 1st place in each class from 15 to 39 years old. When the ratio of "suicide" occupying each age class is observed, it occupies approximately half with 49.8% in the class of 20 to 24 years old and 48.8% in the class of 25 to 29 years

Received 27 June 2012, accepted 10 August 2012

Correspondence to: Masami Inui-Yukawa, Department of Psychiatry, Kitasato University School of Medicine

1-15-1 Kitasato, Minami-ku, Sagami-hara, Kanagawa 252-0374, Japan

E-mail: masami@fg7.so-net.ne.jp

old.<sup>2</sup> Despite these conditions, there are few studies regarding suicide and suicidal behaviors of young people in Japan. There are only: the longitudinal studies on suicidal patients by Kitamura from 1960 to 1970,<sup>3</sup> the preliminary study by Katsumata et al. with 15 Japanese suicide-completers under the age of 30,<sup>4</sup> and the study by Uchida with 987 of completed suicides of university students.<sup>5</sup>

Moreover, regarding the administration of antidepressants to young people, the risk of suicide ideation as well as suicide and suicidal behavior are indicated;<sup>6-8</sup> however, there were various subsequent studies regarding this point, and a consensus has yet to be achieved. Based on these current conditions, with the purpose of clarifying the association of clinical characteristics of suicidal patients among today's youths with the treatment of antidepressants and suicide and suicidal behaviors, an investigation was conducted regarding the tendency of young suicidal patients brought to the Kitasato University Hospital Emergency and Critical Care Medical Center.

## Subjects and Methods

### Subjects

The subjects were patients who were treated at the Kitasato University Hospital Emergency and Critical Care Medical Center within the 5 years from January 2006 to December 2010. A total of 1,086 cases were recognized as suicide or suicidal behavior. In order to investigate clinical characteristics of young people who committed suicide or demonstrated suicidal behavior, we divided all the patients in the present study (1,086 cases) into 3 groups: the "young people group," patients aged 24 years old or younger; the "middle aged group," patients aged 25 to 64 years old; and the "elderly group," patients aged 65 years old or older. There are two experienced psychiatrists in the Emergency and Critical Care Medical Center providing psychiatric treatment to those who are seriously injured and need psychiatric attention. The psychiatrists made psychiatric diagnoses of patients based on clinical interview without using any instruments.

We used definitions of suicide attempts and suicidal behavior based on the recent consensus on the nomenclature for suicidology.<sup>9-11</sup> In the present study, we defined *suicide* as self-injurious behavior resulting in fatality that was associated with at least some intent to end one's own life. Suicide was determined based on objective evidence, such as a suicide note, witness(es), and/or history of suicide attempts, which revealed at least some intent to end one's own life. We defined *suicidal*

*behavior* as the thought, formulation, and/or engagement in potentially life-threatening behavior intended to end one's life, and suicidal behavior was further classified into three categories: suicide ideation, suicide plan, and suicide attempt.

*Suicide ideation* refers to thoughts of wanting to die or thoughts of engaging in behavior intended to end one's own life. *Suicide plan* refers to the formulation of a specific method through which one intended to end one's own life. *Suicide attempt* refers to a potentially self-injurious behavior associated with at least some intent to end one's own life as a result of the act. Evidence that the individual intended to end one's own life, at least to some degree, needs to be explicit or inferred from behavior or circumstance. We distinguished suicide and suicidal behavior from nonsuicidal self-injury, which refers to self-injury with no intent to end one's own life.

The Kitasato University Hospital is a medical institute that takes in serious emergency patients on a round-the-clock basis with approximately 2,000 patients a year transported by ambulance, of which approximately 12% are patients who committed suicide and/or demonstrated suicidal behaviors. The Kitasato University Hospital is located in Sagami-hara, Kanagawa Prefecture, next to Tokyo. The medical service area thereof includes a part of Tokyo. The population in the medical service area is continuing to increase as it is a bedtown of Tokyo, with a population influx consisting of mainly a younger generation observed particularly in Sagami-hara; there is a large population of people in their 20s, 30s, and 50s, along with many students, due to there being many universities in the city. Completed suicides in Sagami-hara were more common in males in their teens to their 40s and females in their teens to their 20s compared to the rest of the nation.

### Methods

We conducted a retrospective study of the patients' medical records. The diagnostic criteria were based on the International Statistical Classification of Diseases and Related Health Problems, 10th Revision (ICD-10), Mental and Behavioral Disorders (F2: Schizophrenia, schizotypal, and delusional disorders; F3: Mood disorders; F4: Neurotic, stress-related, and somatoform disorders; F5: Behavioral syndromes associated with physiological disturbances and physical factors; F6: Disorders of adult personality and behavior). We collected demographic data and clinical features of all patients from their medical records, including age, gender, psychiatric diagnosis at the Emergency and Critical Care Medical Center, methods of attempting suicide, history

of suicide attempts, history of psychiatric consultation (contents of psycho-pharmacological treatment), living status (living with someone or living alone), and the reason for attempting suicide, according to Axis IV, that involves rating psychosocial stressors that may affect an individual, of the DSM-IV-TR (Diagnostic and Statistical Manual of Mental Disorders, 4th edition, text revision).

In order to further clarify the clinical characteristics of young suicidal patients, we first compared the 202 cases of the young people group to the other groups. And next, we focused only on the young people group and made analyses based on gender and age group. In the young people group, we defined the group of patients aged younger than 20 years old as the "teenager group," and the group of patients aged 20 to 24 years old as "young adult group." The following comparisons were made.

*Comparisons among the three groups: the young people group, middle aged group, and elderly group*

The mean age, standard deviation, and the ratio of females were obtained for the three groups: the young people group (202 cases), the middle aged group (781 cases), and the elderly group (103 cases); and subsequently, comparisons were made regarding: complications of psychiatric disorders-"F2," "F3," "F4," "F6," "no diagnosis," and "diagnosis unknown"; methods of attempting suicide-"poisoning, OTC (over-the counter) drugs," "jumping from a high place," "suffocation," and "cutting or stabbing"; history of suicide attempts; history of psychiatric consultation; living status; outcome of "death."

*Comparisons in the young people group based on gender and age group*

The young people group was divided based on gender

(59 cases in the male group, 143 cases in the female group) and by the age groups (82 cases in the teenager group, 120 cases in the young adult group) to obtain the mean age and standard deviation. Subsequently, comparisons were made regarding complications of psychiatric disorders: "F2," "F3," "F4," "F5," "F6," and "no diagnosis"; methods of attempting suicide "poisoning"; history of suicide attempts; history of psychiatric consultation; living status; outcome of "death."

*Comparisons in the young people group based on the presence of antidepressant treatment*

Internal medicines taken before attempting suicide and suicidal behaviors by the 202 people in the young people group were investigated, and the methods of attempting suicide "poisoning," "jumping from a high place," "suffocation," and "cutting or stabbing"; history of suicide attempts; outcome of "death"; were compared based on the presence of antidepressant treatment and selective serotonin reuptake inhibitor (SSRI) treatment. Logistic regression analysis was conducted to assess associations between antidepressant treatment and dependent variables found to be significant in the  $\chi^2$  test. Dependent variables were poisoning as a method of attempting suicide, history of suicide attempts, and the outcome of death. Independent variable was the presence of antidepressant treatment.

*Comparisons in the young people group based on their reasons for attempting suicide*

The major reasons for attempting suicide in the young people group were compared based on the age groups (82 cases in the teenager group, 120 cases in the young adult group) and gender (59 cases in the male group, 143

**Table 1.** Demographic characteristics of all patients

	Young people group (12-24 years old)	Middle aged group (25-64 years old)	Elderly group (65-99 years old)	Total (12-99 years old)
	N	N	N	N
	Age, mean (SD)	Age, mean (SD)	Age, mean (SD)	Age, mean (SD)
Male	59 20.4 (3.2)	309 42.2 (10.8)	49 73.8 (7.1)	417 42.9 (16.7)
Female	143 19.7 (2.9)	472 38.5 (10.3)	54 74.8 (8.1)	669 37.4 (16.2)
Total	202 19.9 (3.0)	781 40.0 (10.7)	103 74.3 (7.6)	1086 39.5 (16.6)
Female rate (%)	70.8	60.4	52.4	61.6

**Table 2.** Comparisons among the three groups: the young people group, middle aged group, and elderly group

	Overall (n = 1,086)	Young people group (n = 202)	Middle aged group (n = 781)	Elderly group (n = 103)	P
Complications of psychiatric disorders					
F2, n (%)	157 (14.5)	25 (12.4)	125 (16.0)	7 (6.8)	0.029*
F3, n (%)	382 (35.2)	47 (23.3)	295 (37.8)	40 (38.8)	0.000**
F4, n (%)	69 (6.4)	25 (12.4)	41 (5.2)	3 (2.9)	0.000**
F6, n (%)	95 (8.7)	25 (12.4)	70 (9.0)	0 (0.0)	0.001**
No diagnosis, n (%)	201 (18.5)	47 (23.3)	122 (15.6)	32 (31.1)	0.000**
Diagnosis unknown, n (%)	132 (12.2)	23 (11.4)	93 (11.9)	16 (15.5)	0.533
Methods of attempting suicide					
Poisoning, n (%)	503 (46.3)	134 (66.3)	351 (44.9)	18 (17.5)	0.000**
OTC (over-the-counter) drugs, n (% poisoning)	111 (22.1)	55 (41.0)	51 (14.5)	5 (27.8)	0.000**
Jumping from a high place, n (%)	148 (13.6)	30 (14.9)	111 (14.2)	7 (6.8)	0.102
Suffocation, n (%)	161 (14.8)	11 (5.4)	114 (14.6)	36 (35.0)	0.000**
Cutting or stabbing, n (%)	116 (10.7)	11 (5.4)	89 (11.4)	16 (15.5)	0.012*
History of suicide attempts, n (%)	427 (39.3)	85 (42.1)	319 (40.8)	23 (22.3)	0.001**
History of psychiatric consultation, n (%)	745 (68.6)	121 (59.9)	572 (73.2)	52 (50.5)	0.000**
Living status, n (%)	829 (76.3)	153 (75.7)	591 (75.7)	85 (82.5)	0.299
Outcome of death, n (%)	240 (22.1)	27 (13.4)	167 (21.4)	46 (44.7)	0.000**

$\chi^2$  test or Fisher's exact test

\*P < 0.05, \*\*P < 0.01

**Table 3.** Comparisons in the young people group based on gender and age group

	Male group (n = 59)	Female group (n = 143)	P	Teenager group (n = 82)	Young adult group (n = 120)	P
Complications of psychiatric disorders						
F2, n (%)	12 (20.3)	13 (9.1)	0.027*	4 (4.9)	21 (17.5)	0.008**
F3, n (%)	13 (22.0)	34 (23.8)	0.790	19 (23.2)	28 (23.3)	0.979
F4, n (%)	6 (10.2)	19 (13.3)	0.643	9 (11.0)	16 (13.3)	0.669
F5, n (%)	0 (0.0)	8 (5.6)	0.108	4 (4.9)	4 (3.3)	0.718
F6, n (%)	1 (1.7)	24 (16.8)	0.002**	8 (9.8)	17 (14.2)	0.392
No diagnosis, n (%)	17 (28.8)	30 (21.0)	0.231	30 (36.6)	17 (14.2)	0.000**
Methods of attempting suicide						
Poisoning, n (%)	32 (54.2)	102 (71.3)	0.019*	59 (72.0)	75 (62.5)	0.163
History of suicide attempts, n (%)	17 (28.8)	68 (47.6)	0.014*	25 (30.5)	60 (50.0)	0.006**
History of psychiatric consultation, n (%)	30 (50.8)	91 (63.6)	0.092	41 (50.0)	80 (66.7)	0.018*
Living status, n (%)	47 (79.7)	106 (74.1)	0.404	74 (90.2)	79 (65.8)	0.000**
Outcome of death, n (%)	15 (25.4)	12 (8.4)	0.001**	9 (11.0)	18 (15.0)	0.529

$\chi^2$  test or Fisher's exact test

\*P < 0.05, \*\*P < 0.01

cases in the female group).

Statistically, the  $\chi^2$  test or Fisher's exact test was used and a significance level of 5% was determined as indicating a significant difference.

Moreover, this study was approved by the ethics committee of the Kitasato University School of Medicine, and personal information was managed according to the Personal Information Protection Law of Japan with consideration so that personal names were not specified in the information of individual subjects to protect the patients' right to privacy.

## Results

### *Comparisons among the young people group, middle aged group, and elderly group (Table 2)*

Demographic characteristics of all patients who committed suicide or demonstrated suicidal behavior are presented in Table 1. The mean age (standard deviation: SD) was 19.9 years old (3.0 SD) in the young people group, 40.0 years old (10.7 SD) in the middle aged group, and 74.3 years old (7.6 SD) in the elderly group. The ratio of females was 70.8% in the young people group, 60.4% in the middle aged group, and 52.4% in the elderly group, with the ratio of females being higher in young people.

Regarding psychiatric disorders, "F4" and "F6" in the young people group, "F2" and "F3" in the middle aged group, and "no diagnosis" in the elderly group were significantly more common compared with those in the other groups. Significant results were not obtained in "diagnosis unknown."

Regarding the methods of attempting suicide, poisoning accounted for 66.3% in the young people group, which was significantly more than that in the other groups and among those, 41.0% were poisonings using OTC (over-the-counter) drugs such as analgesics, antipyretics, all-in-one cold and flu capsules, sleeping pills, etc. Suffocation was significantly more common in the elderly group than that in the other groups. Significant results were not obtained regarding jumping from a high place. Cutting or stabbing was significantly less common in the young people group compared to that in the other groups, with mild cases such as wrist cutting observed in young people and serious cases such as self-inflicted wounds to the abdomen observed in elderly people.

The history of suicide attempts was significantly less common in the elderly group. The history of psychiatric consultation was significantly more common in the middle aged group. Significant results were not obtained regarding "living status," which would indicate the

influence of living with another person or persons. The outcome of death was significantly more common in the elderly group.

### *Comparisons in the young people group based on gender and age group (Table 3)*

The annual change in the number of young suicidal patients in the 5-year period from 2006 to 2010 gradually increased from 29 to 50 cases.

Comparing the psychiatric disorders between the males (59 cases) and the females (143 cases), "F2" among males and "F6" among females were significantly more common. Poisoning and history of suicide attempts were significantly more common among females. The outcome of death was significantly more common in males.

In the comparisons between the teenager group (82 cases) and the young adult group (120 cases), the "F2" psychiatric disorder was significantly more common in the young adult group, and "no diagnosis" was significantly more common in the teenager group. "History of suicide attempts" and "history of psychiatric consultation" were significantly more common in the young adult group. "Living status," i.e., living with another person or persons, was significantly more common in the teenager group.

### *Comparisons in the young people group based on the presence of antidepressant treatment*

There were 47 patients receiving treatment with antidepressants in the young people group, which is 23.3% of all young people; moreover, there were 35 patients being treated with SSRIs among the patients treated with antidepressants (74.5%).

In the comparisons of the group receiving treatment with antidepressants (47 cases) and the non-treatment group (155 cases), poisoning and history of suicide attempts were significantly more common in the group receiving treatment with antidepressants, and the outcome of death was significantly more common in the non-treatment group. Logistic regression analysis was conducted regarding the items observed with significant differences in the  $\chi^2$  test. As a result, significant differences were observed in poisoning (OR; odds ratio = 0.432, 95%CI; confidence interval = 0.192-0.972, P = 0.042) and a history of suicide attempts (OR = 0.380, 95%CI = 0.192-0.753, P = 0.006); however, no significant differences were observed regarding the outcome of death (P = 0.366) (Table 4A). Moreover, there were no particular items observed with significant differences in the  $\chi^2$  test when the SSRI-treatment group (35 cases) and non-SSRI-treatment group (12 cases) were compared



**Table 4A.** Comparisons in the young people group based on the presence of antidepressant treatment

	Group receiving treatment with antidepressants (n = 47)	Non-treatment group (n = 155)	P
Methods of attempting suicide			
Poisoning, n (%)	38 (80.9)	96 (61.9)	0.016*
Jumping from a high place, n (%)	4 (8.5)	26 (16.8)	ns
Suffocation, n (%)	0 (0.0)	11 (7.1)	ns
Cutting or stabbing, n (%)	2 (4.3)	9 (5.8)	ns
History of suicide attempts, n (%)	29 (61.7)	56 (36.1)	0.002*
Outcome of death, n (%)	2 (4.3)	25 (16.1)	0.048

$\chi^2$  test or Fisher's exact test

\*Items observed with significant difference as a result of logistic regression analysis

Poisoning (OR; odds ratio = 0.432, 95%CI; confidence interval = 0.192-0.972, P = 0.042),

History of suicide attempts (OR = 0.380, 95%CI = 0.192-0.753, P = 0.006),

Outcome of death (P = 0.366)

**Table 4B.** Comparisons in the group receiving treatment with antidepressants based on the presence of SSRI treatment

	SSRI-treatment group (n = 35)	Non-SSRI-treatment group (n = 12)	P
Methods of attempting suicide			
Poisoning, n (%)	26 (74.3)	12 (100.0)	0.051
Jumping from a high place, n (%)	4 (11.4)	0 (0.0)	0.560
Suffocation, n (%)	0 (0.0)	0 (0.0)	-
Cutting or stabbing, n (%)	2 (5.7)	0 (0.0)	1.000
History of suicide attempts, n (%)	23 (65.7)	6 (50.0)	0.493
Outcome of death, n (%)	2 (5.7)	0 (0.0)	1.000

$\chi^2$  test or Fisher's exact test

**Table 5.** Major reasons for attempting suicide

	n (%)
Problems with primary support group	22 (10.9)
Problems related to the social environment	13 (6.4)
Educational problems (e.g., academic problems; discord with teachers or classmates; inadequate school environment)	28 (13.9)
Occupational problems	18 (8.9)
Economic problems	2 (1.0)
Problems with access to health care services	2 (1.0)
Problems related to interaction with the legal system/crime	3 (1.5)
Psychosocial problems (e.g., male-female relationships; relationships with friends)	43 (21.3)
Unknown/no information	71 (35.1)
Total	202 (100)

**Table 6.** Comparisons in the young people group based on the reason for attempting suicide

	Teenager group (n = 82)	Young adult group (n = 120)	P	Male young adult group (n = 40)	Female young adult group (n = 80)	P
Reason for suicide attempt						
Problems with primary support group, n (%)	12 (14.6)	10 (8.3)	0.158	3 (7.5)	7 (8.6)	1.000
Problems related to the social environment, n (%)	5 (6.1)	8 (6.7)	1.000	0 (0.0)	8 (10.0)	0.051
Educational problems, n (%)	17 (20.7)	11 (9.2)	0.019*	3 (7.5)	8 (10.0)	0.750
Occupational problems, n (%)	2 (2.4)	16 (13.3)	0.010*	9 (22.5)	7 (8.6)	0.048*
Economic problems, n (%)	0 (0.0)	2 (1.7)	0.515	0 (0.0)	2 (2.5)	0.552
Psychosocial problems, n (%)	20 (24.4)	23 (19.2)	0.373	3 (7.5)	20 (25.0)	0.026*

$\chi^2$  test or Fisher's exact test

\*P < 0.05

among the patients in the group receiving treatment with antidepressants (Table 4B).

*Comparisons in the young people group based on the reason for attempting suicide (Tables 5, 6)*

In the comparison between the teenager group (82 cases) and the young adult group (120 cases), school and educational problems were significantly more common in the teenager group, and occupational problems were significantly more common in the young adult group. Occupational problems were significantly more common in the male young adult group (40 cases), and psychosocial problems were significantly more common in the female young adult group (80 cases). No significant results were obtained between the males and females of any group.

## Discussion

These results clarified that the characteristics of young suicide attempters were as follows. (1) From a comparison with other generations, the psychiatric diagnoses of F4 and F6 were significantly more common, and poisoning was the most common method of attempting suicide. (2) Though females had a significantly higher ratio of suicide attempters among young people, the fatality ratio was significantly higher among males, with psychiatric diagnoses of F2 and F6 being significantly more common in males and in females, respectively. (3) Comparing the group receiving treatment with antidepressants and the non-treatment group, poisoning and history of suicide attempts were significantly higher in the group receiving antidepressants. (4) When the group treated with antidepressants was divided into two subgroups depending on SSRI treatment or not, there were no

significant differences between them. (5) Regarding the reason for attempting suicide in young people, school and educational problems were significantly more common in the teenager group, and occupational problems were significantly higher in the young adult group, and it was clarified that in females in the young adult group, psychosocial problems were significantly more common than in males.

### *Young suicide attempters*

According to past studies, both foreign and domestic, completed suicides are overwhelmingly more common among males in most countries, while survivors of suicide attempts are more common among females.<sup>2,12</sup> In the present study, the number of completed suicides was not significantly different in males (15 cases, n = 59) and females (12 cases, n = 143), but the ratio of completed suicides among patients was 25.4% in males and 8.4% in females, with males approximately 3 times higher than females.

A past history of suicide attempts was significantly more common among females than males, and likewise in the young adult group than in the teenager group. These results correlate to those in past reports stating that suicide and suicidal behaviors are more common in young females.<sup>13,14</sup>

Moreover, regarding psychiatric disorders, the ratio of F4 and F6 was significantly more common in young suicide attempters compared to the middle aged and elderly groups, with the ratio of F2 and F3 significantly increasing among middle aged people. In the comparison between genders in the young people group, the ratio of F2 was significantly higher among males, while the ratio of F6 was significantly higher among females. These results also conformed with other studies in Japan.<sup>15,16</sup>

As the method for suicides in young people, poisoning

was the most common at 66.3%, with 41.0% among those being OTC (over-the-counter) drugs such as analgesics, antipyretics, all-in-one cold and flu capsules, sleeping pills, etc., which was significantly more prevalent than that in other generations. Though there are few reports from Japan regarding poisoning in young people, according to the report by Moriji et al.,<sup>17</sup> the breakdown of poisoning was: 57% for prescribed drugs and 43% for OTC drugs, which is nearly the same as that in the present study. Therefore, it is important to provide education on drug management and safety for the general society.

#### *Treatment with antidepressants associated with suicide and suicidal behavior*

In the comparisons in the present study regarding the presence of antidepressant treatment, it was revealed that poisoning and history of attempted suicide were significantly more common in the group treated with antidepressants, and the outcome of death was significantly higher in the non-treatment group as revealed by the  $\chi^2$  test. And the result of logistic regression analysis indicated that those who were under the treatment of antidepressants were likely to attempt suicide by poisoning and likely to have a history of attempted suicide. From these results alone, it cannot be concluded that the risk of suicide and suicidal behavior in young people have increased due to the use of antidepressants; but in the studies in the literature to date, some indicate that the risks of suicide ideations, suicide, and suicidal behavior increase due to the increased treatment with antidepressants in young people especially.<sup>6-8</sup> Meanwhile, in a recent Japanese study<sup>18</sup> on suicide-related events by short-term antidepressant treatment to child and adolescent patients, it was reported that although antidepressants significantly reduce suicide-related events, patients with continued risk of suicide-related events have the characteristics of being female, having psychotic features, borderline personality disorder, history of suicide-related events, anhedonia, easy stimulability, and hopelessness as the baseline. Currently, a consensus has not been obtained regarding the association between antidepressant administration to young people and suicide and suicidal behavior, although the prescription of antidepressants to treat young people must be done with extreme care.

Moreover, from these results, a significant difference was observed in the fatality rate of the group under treatment with antidepressants and the non-treatment group in  $\chi^2$  test; and the outcome of death was significantly higher in the non-treatment group. However, no significant differences were observed in the logistic

regression analysis. According to studies from outside Japan, there was a study in 1998 mentioning that the prescription rate of SSRIs was 52% and the prescription rate of tricyclic antidepressants was 24%, the fatality rate due to overdose of SSRI antidepressants was 4% and 86% with tricyclic antidepressants, wherein, an increased prescription rate of SSRIs decreased lethality, which in turn, indirectly decreased the fatality rate.<sup>19</sup> The increasing number of suicides and suicidal behavior in young people and the fatality rate warrant further investigations, especially regarding the association of therapies with antidepressants.

#### *Reasons for attempting suicide in young people*

The results revealed that the reasons for attempting suicide in the young people group, school and educational problems were significantly more common in the teenager group and occupational problems were significantly more common in the young adult group; and in the young adult group, psychosocial problems were significantly more common in females than males. In the study by Kitamura<sup>3</sup> with suicide attempters aged 20 years old or younger in Japan from 1960 to 1970, and the research more recently conducted by Katsumata et al.<sup>4</sup> regarding 15 Japanese suicide-completers under the age of 30, both reports suggest the possibility of school and educational problems having a major effect. Though the problem has been indicated for quite some time, there are few reports regarding approaches of suicide prevention in schools and students in Japan and/or the effects thereof. In foreign countries, there are reports<sup>20</sup> mentioning that both victims and assailants of bullying have a high risk of suicide and suicidal behaviors, and various approaches are being taken. Regarding suicides in young people, it is reported that there were various attempts at factual investigations and prevention programs being offered, and, thus, suicides in young people are currently on the decline.<sup>21,22</sup> Educating students and school educators contributions to preventing student suicides and increasing public awareness is noted in the official Japanese government outlines as comprehensive measures to prevent suicide in Japan.<sup>23</sup> However, extensive research and prevention programs regarding suicide and suicidal behavior in young people have not been carried out and remains a future issue. Problems of suicide and suicidal behavior in young people is likely to have an effect on other people of the same generation and cause social problems; therefore, immediate countermeasures and correspondences are urgently desired.

There are some limitations to this study worth noting.



First, this study is a retrospective study, therefore, for patients who deceased immediately after arrival to the hospital included cases for which collecting sufficient information was difficult and in some cases even impossible. Psychological autopsies were not conducted in this study. Secondly, this study was from a single institute in Kanagawa Prefecture with a small number of cases, therefore, more extensive accumulation of cases is necessary in order to more thoroughly evaluate young Japanese suicidal patients and to more accurately clarify the association with clinical characteristics and antidepressants.

## References

1. National Police Agency. Statistics on suicides in Japan in 2010-2011. Available at: <http://www8.cao.go.jp/jisatsutaisaku/toukei/pdf/siryou/jyoukyou2.pdf>. Accessed June 1, 2012 (in Japanese).
2. Ministry of Health, Labour and Welfare. Vital statistics in Japan in 2009. Available at: <http://www8.cao.go.jp/jisatsutaisaku/whitepaper/w-2011/pdf/gaiyou/pdf/p2-9.pdf>. Accessed June 1, 2012 (in Japanese).
3. Kitamura A. Comparative study of attempted suicide among young persons in Germany and Japan. *Seishin Shinkeigaku Zasshi* 1983; 85: 54-68 (in Japanese).
4. Katsumata Y, Matsumoto T, Kitani M, et al. School problems and suicide in Japanese young people. *Psychiatry Clin Neurosci* 2010; 64: 214-5.
5. Uchida C. Suicide among Japanese university students: from the results of a 21-year survey. A clue to prevent suicide among university students. *Seishin Shinkeigaku Zasshi* 2010; 112: 543-60 (in Japanese).
6. Okada T. Risk and benefits of antidepressant or augmentation therapy in children and adolescents with major depression. *Jpn J Clin Psychopharmacol* 2009; 12: 263-72 (in Japanese).
7. Tajima O. Bright and dark side of newer antidepressants. *Jpn J Clin Psychopharmacol* 2008; 11: 1803-11 (in Japanese).
8. Tsuji K, Tajima O. Increase of the risk of suicide by antidepressants. *Jpn J Clin Psychopharmacol* 2011; 14: 249-56 (in Japanese).
9. Nock MK, Borges G, Bromet EJ, et al. Suicide and suicidal behavior. *Epidemiol Rev* 2008; 30: 133-54.
10. Posner K, Oquendo MA, Gould M, et al. Columbia Classification Algorithm of Suicide Assessment (C-CASA): classification of suicidal events in the FDA's pediatric suicidal risk analysis of antidepressants. *Am J Psychiatry* 2007; 164: 1035-43.
11. Silverman MM, Berman AL, Sanddal ND, et al. Rebuilding the tower of Babel: a revised nomenclature for the study of suicide and suicidal behaviors. Part 2: suicide-related ideations, communications, and behaviors. *Suicide Life Threat Behav* 2007; 37: 264-77.
12. World Health Organization. Suicide prevention (SUPRE). 2000. Available at: [http://www.who.int/mental\\_health/prevention/suicide/suicideprevent/en/](http://www.who.int/mental_health/prevention/suicide/suicideprevent/en/). Accessed June 1, 2012.
13. Hawton K, Rodham K, Evans E. By their own young hand: deliberate self-harm and suicidal ideas in adolescents. London: Jessica Kingsley Publishers; 2006.
14. Wasserman D. Suicide: An unnecessary death. London: Martin Dunitz; 2001.
15. Hatta K, Takahashi T, Yamashiro H, et al. Differential diagnosis of depressive state among patients attempting suicide: a report from a critical care center. *Jpn J Psychiatr Treat* 1998; 13: 191-5 (in Japanese).
16. Sekine M, Suzuki H, Takezawa K, et al. A study of suicide attempters who were admitted to the critical care and emergency center. *Jpn J Gen Hosp Psychiatry* 2004; 16: 257-62. (in Japanese).
17. Morichi S, Kawashima H, Akibayashi M, et al. Clinical study of massive intentional drug overdose-related acute poisoning in young persons. *J Jpn Soc Emerg Pediatrics* 2010; 9: 16-20 (in Japanese).
18. Kuba T, Yakushi T, Fukuhara H, et al. Suicide-related events among child and adolescent patients during short-term antidepressant therapy. *Psychiatry Clin Neurosci* 2011; 65: 239-45.
19. Grunebaum MF, Ellis SP, Li S, et al. Antidepressants and suicide risk in the United States, 1985-1999. *J Clin Psychiatry* 2004; 65: 1456-62.
20. Kaltiala-Heino R, Rimpelä M, Marttunen M, et al. Bullying, depression, and suicidal ideation in Finnish adolescents: school survey. *BMJ* 1999; 319: 348-51.
21. Aseltine RH Jr, DeMartino R. An outcome evaluation of the SOS Suicide Prevention Program. *Am J Public Health* 2004; 94: 446-51.
22. Shaffer D, Craft L. Methods of adolescent suicide prevention. *J Clin Psychiatry* 1999; 60: 70-6,113-6.
23. Cabinet office, Government of Japan. Comprehensive measures to prevent suicide. 2007. Available at: <http://www8.cao.go.jp/jisatsutaisaku/sougou/taisaku/pdf/t.pdf>. Accessed June 1, 2012 (in Japanese).