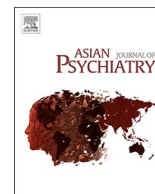




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Asian pearls

## Clinical characteristics of suicidal behavior in an intensive care unit at a university hospital in Japan: A 7-year observational study

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## ABSTRACT

**Background:** Suicidal behavior accounts for at least 40,000 admissions per year to emergency departments in Japan; however, little is known about emergency admissions owing to suicidal behavior in metropolitan areas. Therefore, we examined the clinical characteristics of suicidal behavior using psychosocial assessments performed by experienced psychiatrists in an intensive care unit.

**Methods:** Participants were 971 patients admitted to a university hospital's intensive care unit for suicidal behavior between July 2006 and June 2013. Physicians and psychiatrists regularly assessed the participants using a standard data extraction form while the participants were in the intensive care unit. As suicidal behavior involving drug overdose is generally less fatal than other methods, we predicted that clinical characteristics would differ between patients with and without overdose. We classified participants into drug overdose or other method groups ( $n_s = 732$  and  $239$ , respectively) to compare suicide methods.

**Results:** In the overdose group, participants' median age was approximately 5 years lower, and the following proportions were larger: female participants (77%) and participants with borderline personality disorders (21% vs. 10%), no clear suicidal ideation (30% vs. 15%), impulsively attempted self-harm (86% vs. 62%), and interpersonal problems (26% vs. 16%).

**Conclusion:** Ameliorating interpersonal problems and improving stress coping skills would benefit people who attempt suicide via overdose.

## 1. Introduction

In Japan, the annual number of people committing suicide exceeded 30,000 in 1998, and the suicide rate increased to 27.0 per 100,000 population in 2003, recording the highest rate in history. The annual total number fell below 30,000 in 2012 and has gradually decreased since then. However, according to the World Health Organization, the suicide rate in Japan is still as high as 21.7 (2012), which is the tenth highest rate in the world. The most common suicide method is by hanging, which accounts for approximately 60% of all suicides. This is followed by gassing oneself, jumping off a high place, and drug overdose; however, each of these methods accounts for 10% or less of the total number of suicides. Although some people drink alcohol before committing suicide, there are few cases of suicide by drinking. Moreover, because possession of guns is legally prohibited in Japan, suicide using a gun, which is common in the United States and other countries, is also rare (Specified Report of Vital Statistics, 2005).

Each year, suicidal behavior accounts for at least 40,000 admissions to emergency departments in Japan (Japan Organ Transplant Network, 2011). Suicidal behavior is a strong predictor of subsequent suicide and premature death (Finkelstein et al., 2015). Better understanding of region-specific suicidal behavior epidemiology may prevent suicide and reduce the burden of suicidal behavior on emergency medical systems; however, little research has examined suicidal behavior in metropolitan areas in Japan (Hori and Kinoshita, 2016; Kubota et al., 2015; Sugita et al., 2011). Additionally, most studies examining the clinical characteristics of suicidal behavior have not used specialized psychosocial assessment and, therefore, have not collected or assessed some important clinical information (e.g., psychiatric diagnosis) (Hori and Kinoshita, 2016; Kubota et al., 2015; Sugita et al., 2011).

Therefore, we used psychosocial assessments by experienced psychiatrists to examine suicidal behavior's clinical characteristics in an intensive care unit in a university hospital in Tokyo. As suicidal behavior involving drug overdose is generally less fatal than other methods,

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we predicted that clinical characteristics would differ between patients with and without overdose. We also compared clinical characteristics between individuals who attempted suicide via drug overdose and via other methods.

## 2. Methods

### 2.1. Design and setting

The protocol for this research project was approved by a suitably constituted Ethics Committee of the institution and conforms to the provisions of the Declaration of Helsinki. Committee of the Tokyo Medical and Dental University, Approval No. 1604. The requirement to obtain patients' consent was waived as all the data assessed in the study were collected through our regular clinical care. We conducted a 7-year observational study of consecutive patients hospitalized for suicidal behavior (i.e., self-poisoning and self-injuries) in an intensive care unit at the Tokyo Medical and Dental Hospital University in Tokyo, Japan, between July 1, 2006 and June 30, 2013. At our hospital, among patients with suicidal behavior, those deemed to require hospitalization are always admitted to the intensive care unit. The unit provides tertiary emergency care to 10,000–15,000 patients annually.

### 2.2. Data collection

Since 2006, physicians and psychiatrists in the unit had routinely assessed clinical information for all patients who survived self-harm episodes using a standard data extraction form that examines sex, age, psychiatric diagnosis, psychosocial factors (person's predisposing distress, characteristics of attempts, suicidal ideation), and history of outpatient treatment. Two psychiatrists with at least 5 years' experience conducted psychosocial assessment for all patients based on the International Classification of Diseases, 10th Revision. We included patients who died after psychosocial assessment and excluded those who died of critical physical conditions before the psychosocial assessment.

### 2.3. Statistical analysis

First, we created the following categories of suicidal behavior: drug overdose, self-cutting, jumping, chemical poisoning, use of charcoal briquettes, hanging, drowning, traffic, inhaling carbon monoxide, and others. We calculated proportions of these methods by sex.

Second, we divided participants according to major method of suicidal behavior: drug overdose ( $n = 732$ ) and other methods (i.e., non-overdose;  $n = 239$ ). Participants who used a drug overdose in addition to other methods were classified as non-overdose, because such individuals typically used an overdose to encourage themselves to undertake more lethal methods of suicide. The cumulative probability of admissions owing to suicidal behavior as a function of age was estimated by sex and major method of suicidal behavior.

Additionally, we compared the clinical characteristics of suicidal behavior between overdose and non-overdose. We used the standardized difference ( $d$ ) as a categorical variable to measure balances of clinical characteristics between the groups—a standardized difference of  $> 10\%$  indicated imbalance (Austin, 2011). We used chi-squared tests to evaluate differences between the groups. SPSS version 20 was used. Values of  $< 0.05$  were considered significant.

## 3. Results

### 3.1. Methods of suicidal behavior

During the study period, 971 individuals were eligible for analysis. Although there were occasional cases in which some individuals had already died before arrival at our emergency center and thus were not

**Table 1**  
Methods of suicide behavior.

Methods	Total (n = 971) n (%)	Men (n = 273) n (%)	Women (n = 698) n (%)
Drug overdose (only overdose)	732 (75.4)	170 (62.3)	562 (80.5)
Non-overdose			
Self-cutting	88 (9.1)	38 (13.9)	50 (7.2)
Chemical poisoning	37 (3.8)	28 (10.3)	9 (1.3)
Jumping	36 (3.7)	17 (6.2)	19 (2.7)
Use of charcoal briquettes	34 (3.5)	19 (7.0)	15 (2.1)
Hanging	19 (2.0)	8 (2.9)	11 (1.6)
Drowning	9 (0.9)	3 (1.1)	6 (0.9)
Traffic	8 (0.8)	4 (1.5)	4 (0.6)
Inhaling carbon monoxide	4 (0.4)	3 (1.1)	1 (0.1)
Other	4 (0.4)	2 (0.7)	2 (0.3)

admitted, there were, on an average, 1 or 2 participants per year who died after admission and before psychosocial assessment. Moreover, because no participant died after psychosocial assessment, the annual mean number of participants who died by suicide was 1 or 2, which was also the number of participants who died before psychosocial assessment. The most common method of suicidal behavior was drug overdose (75.4%). Among individuals who overdosed, 88.5% used psychotropic drugs prescribed by their physicians. The second most common method was self-cutting that required surgical procedures in an operating room (9.1%) followed by chemical poisoning (3.8%), jumping (3.7%), and use of charcoal briquettes (3.5%; Table 1).

### 3.2. Cumulative probability of suicidal behavior as a function of age

Participants in the overdose group were more commonly women (76.8% vs. 56.9%;  $p < 0.01$ ). Fig. 1 illustrates the cumulative probability of suicidal behavior as a function of age. The median age was approximately 5 years lower in the overdose group (median age: 34 years for men and 32 years for women) than in the non-overdose group (median age: 39 years for men and 36 years for women.).

### 3.3. Diagnosis

The most common diagnosis was major depressive disorder (28.9%) followed by adjustment disorder (22.6%), borderline personality disorder (18.3%), schizophrenia (12.4%), and bipolar disorder (7.8%; Table 2). Participants in the overdose group more commonly had borderline personality disorder (21.0% vs. 10.0%;  $d = 30.7$ ;  $p < 0.05$ ) and less commonly had major depressive disorder (25.7% vs. 38.9%;  $d = 28.6$ ;  $p < 0.05$ ) or schizophrenia (11.1% vs. 16.3%;  $d = 15.3$ ;  $p < 0.05$ ).

### 3.4. Psychosocial factors

The most frequent predisposing distress was family issues (32.5%) followed by interpersonal (23.6%), occupational (11.7%), financial (6.3%), and health problems (5.8%; Table 3). Participants in the overdose group were more likely to have interpersonal issues (26.1% vs. 15.9%;  $d = 25.2$ ;  $p < 0.05$ ) and less likely to have financial problems (4.8% vs. 10.9%;  $d = 22.8$ ;  $p < 0.05$ ).

The most common type of suicidal behavior was impulsive action (80.3%) followed by planned action (12.0%) and action induced by delusion or hallucinations (4.1%; Table 3). In this study, no assessment scale was used to assess the impulsiveness underlying suicidal behavior. This impulsive action was defined as a case in which a participant impulsively attempted suicide without planning or the influence of

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