



Factors associated with suicide method among psychiatric patients in a general hospital in Korea



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ABSTRACT

This study aims to highlight the factors associated with suicide method among psychiatric patients in a general hospital in Korea. In a sample of 467 suicides by patients who had received mental health care in a general hospital in Korea, the relationship between suicide method and time of death as well as clinical characteristics, including psychiatric diagnosis, was examined using multinomial logistic regression analysis. Compared with the general population, psychiatric patients, regardless of disorder, committed suicide by jumping from heights more often than by hanging (OR=2.35–8.64). In particular, patients with psychotic disorders and female patients were more likely to use jumping from a height than hanging to kill themselves (OR=2.98 and 1.83, respectively). Patients were more likely to use suicide methods other than hanging (e.g., OR=6.7 for jumping, 5.3 for drowning, and 2.7 for self-poisoning) between midnight and dawn. Possible suicide-prevention strategies suggested by this study include limiting access to or fencing off tall structures in close proximity to psychiatric institutions and residential care homes. At night, limiting access to or instituting heightened supervision of tall structures is specifically indicated.

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1. Introduction

The study of suicide methods in particular population subgroups contributes to the development of effective intervention strategies for suicide prevention. The factors influencing the selection process of a specific suicide method are the availability, accessibility, and social acceptability of a method (Cantor and Baume, 1998; Pirkola et al., 2003), as well as sex and age (Varnik et al., 2008; Chia et al., 2011; Im et al., 2011). If favored suicide methods can be identified for a specific subpopulation or for a certain time or season, a situation-specific prevention strategy could be implemented, such as limiting access to certain methods at certain times or in settings where corresponding subpopulations live.

Mental illness is one of the strongest risk factors for suicide (Harris and Barraclough, 1997; Mortensen et al., 2000; Park et al., 2013), but studies examining the influence of psychopathology on the choice of suicide method are relatively scarce. A review of the

literature indicates that suicide by jumping from heights is the method of suicide most commonly associated with mental illness (Gunnell and Nowers, 1997; Beautrais, 2007). However, only a few studies have established links between specific psychiatric diagnoses and methods of suicide. Chen et al. (2009a) found an association between suicide by jumping and severe psychopathology, such as schizophrenia, bipolar disorder, and major depressive disorder. More recently, Huisman et al. (2010) reported that psychotic disorders were associated with suicide by jumping and that substance-related disorders were associated with self-poisoning.

Several studies have explored the association between specific suicide methods and sex and age (Varnik et al., 2008; Chia et al., 2011; Im et al., 2011). Females who commit suicide use less violent methods, such as self-poisoning, than do males, who more often use violent methods such as hanging, firearms, and jumping from a height (Denning et al., 2000; Chen et al., 2009b). Jumping and hanging were more frequently used by younger age groups, whereas the use of self-poisoning increased with age (Chia et al., 2011; Im et al., 2011).

Several studies have noted that suicide is largely restricted to the daytime hours (Barraclough, 1976; Altamura et al., 1999; Doganay et al., 2003; Reutfors et al., 2009). One explanation is that daylight

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duration is associated with suicide rates. van Houwelingen and Beersma (2001) reported that suicide rates were the highest between 18:00 and 24:00 h (higher temperatures) and the lowest between 00:00 and 06:00 h (lower temperatures). Two studies of train suicides have investigated the association between the suicide method and time of suicide. A German study of 24-h train suicide patterns found a shift in peak rates from 18:00–21:00 h in the winter to 21:00–00:00 h in the summer (Schmidtke, 1994). van Houwelingen and Beersma (2001) found that in The Netherlands, the rate of train suicides at night was about 10% than during the day, independent of time of year. The authors described two daily peaks, which shifted over the year, with one occurring shortly after sunset, and the other consistently occurring 9–10 h earlier. No studies have examined the association between other methods of suicide and time death.

In view of the limited data, we examined the associations between suicide methods and psychiatric diagnoses and time of death in addition to age and sex of the psychiatric patients.

2. Method

2.1. Subjects

Using electronic medical records, we identified all patients who presented to the psychiatric outpatient clinic of a general hospital located in Seoul, Korea, or who were admitted to that hospital for a psychiatric disorder (from Jan 1995 to December 2006).

The participating hospital is a university-affiliated general hospital with 2680 beds (60 psychiatric beds) located in the South-eastern area of Seoul, Republic of Korea. Seoul is the capital of South Korea and the largest and most populous city in the country, with a population of around 10.2 million. One-fourth of Koreans live in Seoul, and the inhabitants vary in socio-economic status. Seoul has 28 general hospitals that provide psychiatric in-patient services. Although the catchment areas are not strictly divided in Korea, the psychiatric unit of our hospital is believed to cover one million people.

All identified patients were older than 10 years of age at the time of the hospital visit. Among these 32,215 patients, we identified 467 patients who had completed suicide by 31 December, 2009, based on a review of the data on suicide completers from the National Statistical Office (NSO). All deaths in Korea are reported to the NSO via a death notice document that contains the cause of death. NSO data and hospital records were matched using the unique national identification number assigned to all Korean citizens.

The data on demographic variables, such as age and sex, and clinical variables, such as treatment status and psychiatric diagnoses, were obtained from electronic medical records. Age was categorized into the following four groups: 10–29, 30–49, 50–69, and ≥ 70 years. The patients were categorized as those who had received general psychiatric care (inpatients) and those who had not (outpatients). Three psychiatric residents reviewed and confirmed the ICD-10 diagnoses that had been recorded in the electronic medical records by a board-certified psychiatrist. The medical record requirements of the participating hospital included one primary diagnosis and several auxiliary diagnoses based on the ICD-10 coding. The diagnosis used in this study for those with multiple psychiatric disorders was the primary ICD-10 diagnosis provided in the electronic medical records. For the purposes of the present study, these diagnoses were collapsed into eight diagnostic groups: psychotic disorder (F20–F29), bipolar affective disorders (F30–F31), depressive disorders (F32–F33), neurotic disorders (F40–F48), and other psychiatric disorders (diagnoses not included in the above diagnoses).

The data on suicide characteristics, such as method, time, and season of suicide, were obtained from the NSO data on suicide completers. The methods of suicide were categorized as jumping from a height, hanging, self-poisoning, drowning, and other methods. The other methods category included relatively uncommon suicide methods, such as suicide by cutting, fire, jumping into a moving car, and other unspecified means. The time of suicide was categorized into the following 6-h time periods based on a 24-h day: 0–6, 6–12, 12–18, and 18–24 h because the patterns of suicide methods between 00:00 and 03:00 h were similar to those between 03:00 and 06:00 h and so on when the data were presented in 3-h units (Fig. 1).

We used suicide completers in the general population as the reference group for each diagnostic group. We selected 467 suicide completers from the general population using a stratified random sampling proportional to the psychiatric population each year. The study was approved by the institutional review board (IRB) for human subjects at the Asan Medical Center, Ulsan University College of Medicine.

2.2. Statistical analysis

We performed a multinomial logistic regression analysis as a more general model to predict outcome with more than two categories (method of suicide). The

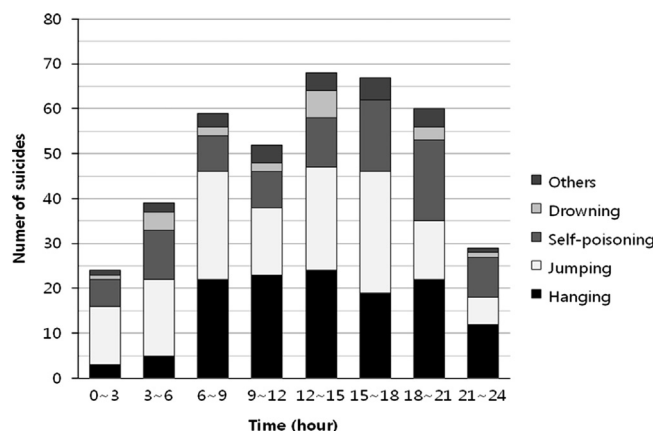


Fig. 1. Suicide methods according to time of day.

dependent variables in the multinomial regression analysis were jumping, self-poisoning, drowning, and all other means. Hanging was chosen as the category of reference because it was the most common method of suicide in the general population. The independent variables in the multinomial regression analysis were diagnosis, sex, age, treatment status, time of death, and season of death. Independent variables that were statistically significant in univariate multinomial logistic regression analyses were submitted to a multivariate multinomial logistic regression analysis. The variables selected using backward elimination were evaluated in a multivariable analysis. We used multiple imputations for missing data about the time variable ($n=69$, 14.8%). We accounted for missing values by multiple imputations with the Markov chain Monte Carlo (MCMC) method (van Buuren et al., 1999). All statistical analyses were performed with SPSS (version 12.0; SPSS Inc., Chicago, IL), and an α -level less than 0.05 was considered significant.

3. Results

The study sample of psychiatric patients consisted of 230 men and 237 women with mean ages of 46.5 (S.D. 16.9) and 46.3 (S.D. 17.5) years, respectively. The most common Axis I diagnosis was depressive disorders. Of the 467 cases examined, 269 (57.6%) had received general psychiatric care (inpatients), and 198 (42.4%) had not (outpatients). The most frequently used methods of suicide were jumping from a height (35.1%), hanging (31.9%), self-poisoning (20.8%), and drowning (4.3%; Table 1). The general population reference group consisted of 328 men and 139 women with mean ages of 49.1 (S.D. 16.9) and 50.9 (S.D. 20.4) years, respectively. The most frequently used methods of suicide were hanging (42.2%), self-poisoning (36.2%), jumping from a height (12.2%), and drowning (3.2%).

Patients with psychotic disorders were more likely to use jumping from a height than hanging to kill themselves ($OR=3.04$). Similarly, females were more likely to use jumping from a height than hanging to kill themselves ($OR=1.66$). Compared with older patients, people under 30 years of age used jumping more often than hanging ($OR=3.37$). Compared with outpatients, patients who had received inpatient treatment used jumping ($OR=1.8$) and drowning ($OR=3.5$) more often than hanging. Patients were more likely to use suicide methods other than hanging (e.g., $OR=6.7$ for jumping, 5.3 for drowning, and 2.7 for self-poisoning) between midnight and dawn. In the morning, patients used self-poisoning less often than hanging ($OR=0.45$; Table 2).

In the multivariate analysis using a backward elimination method, the associations between jumping and psychotic disorders and gender ($OR=2.98$ and 1.83, respectively) persisted. Moreover, the positive associations between jumping and drowning and nighttime suicide ($OR=5.94$ and 5.44, respectively), and negative association between self-poisoning and suicide in the morning ($OR=0.47$) persisted. However, the significant associations between each suicide method and age and treatment status disappeared in the multivariable analyses (Table 3).

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