



## Research report

## Suicidal behaviors in elderly Koreans: One-month-point prevalence and factors related to suicidality



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## A B S T R A C T

**Background:** Suicide prevention in the elderly is a major public health priority worldwide and in Korea in particular. We investigated the one-month-point prevalence and factors related to suicidality for suicidal behaviors in elderly Koreans.

**Methods:** A simple random sample ( $N=1588$ ) was drawn from the residential roster of 14,051 Koreans aged 60 years or older who were residents of Osan in February 2010. All subjects were invited to participate in the survey through door-to-door home visits, and the response rate was 59.8%.

**Results:** The age- and gender-standardized prevalence rates of lifetime suicide attempts, current suicidal ideation without a plan or attempt, and current suicidal ideation with a plan or attempt were estimated at 9.2%, 19.6%, and 2.24%. The prevalence of suicidal ideation without a plan or attempt was higher in women and less-educated individuals and increased with advancing age, whereas the prevalence of suicidal ideation with a plan or attempt was higher in more-educated individuals, was not differentiated by gender, increased until age 70, and then decreased thereafter. The factors related to suicidal ideation differed by the presence of a suicide plan or attempt.

**Conclusions:** Depressive elders in their 70s who have recently developed suicidal ideation would be a prime target for suicide intervention programs.

**Limitations:** The sample was regional, although the suicide rate in Osan was comparable to the average suicide rate in Korea.

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## 1. Introduction

The suicide rate in South Korea (hereafter, Korea) is the highest among the thirty member-countries of the Organization for Economic Co-operation and Development (OECD) (Development, 2008; Office, 2007). Although suicide rates increased in the 1970s and peaked at the beginning of the 1980s in most countries, this pattern was not observed in Korea. In 2010, 31.2 per 100,000 Koreans committed suicide—an increase of 69.6% from 1998 (18.4 per 100,000 Koreans). This was about two times higher than the average suicide rate worldwide (16.7 per 100,000 persons per year) (World Health Organization, 2007). Suicide was the fourth most common cause of death in Korea in 2010, accounting for 6.2% of all deaths (Hong and Choi, 2011).

Although the risk of suicide may be attributed to various psychosocial and biological factors (Shah et al., 2007), with a rapidly aging population, the recent steep rise of suicide in Korea seems to be related to the rise of suicide in the elderly (Office, 2007). In 2010, the suicide rates of Koreans aged 60–69 years, 70–79 years, and over 80 years were 52.7, 83.5, and 123.3 per 100,000 persons, respectively. These rates were about two times higher than those in 2000 (World Health Organization, 2007) and five times higher than rates in the United States (Office, 2007). Although suicide rates generally increased with advancing age, the age-dependent increase in suicide was much steeper in Korea than in other countries, reaching more than ten times higher in the eldest group (75 years and above) compared to that of young people aged 15–24 years (Development, 2008, 2009). In addition, Korea has undergone tremendous sociocultural, economic, and political changes for the past few decades, and many elderly Koreans may have difficulty appraising their lives satisfactorily in its success-oriented atmosphere (Lee et al., 2011).

Most previous studies on suicide in the elderly have been conducted in Western countries and estimated lifetime and/or

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one-year prevalence. However, the risk of suicide seemed to vary considerably over time because 86% of the suicides occurred in the low risk groups (Suicide et al., 2006), suggesting that lifetime or one-year-point prevalence may not accurately reflect the risk of imminent suicidality that should be a prime target of suicide intervention programs. In addition, country- or region-specific studies on suicide are warranted because the risk of suicide is influenced by complex interactions between various genetic and environmental factors.

The objectives of the present study are to estimate the one-month-point prevalence of suicidal behaviors and to examine factors related to suicidality for the imminent suicidal behaviors in elderly Koreans. This may be a good starting point for designing and implementing effective suicide intervention programs for elderly Koreans and may possibly provide a good reference for other developing countries that are considering Korea as their development model.

## 2. Methods

### 2.1. Sample

This study was conducted as a part of the Osan Mental Health Survey by the Osan Community Mental Health Center. Osan is a city in Gyeonggi Province, Korea, approximately 35 km south of Seoul. The total population of the city was 162,809 in February 2010. The local economy is supported by a mix of agricultural and industrial enterprises.

A simple random sample ( $N=1588$ ) was drawn from the residential roster of 14,051 Koreans aged 60 years or older who were residents of Osan in February 2010. Among them, 164 were not eligible because 20 were dead, 55 had moved, and 89 were not traceable at home. These 89 individuals who were not traceable were listed on the residential roster of Osan but were living in other parts of Korea. Among the 1424 eligible individuals, 848 subjects (age =  $71.1 \pm 7.3$  years old, female = 59.8%) were eligible for the current analysis (response rate = 59.6%). All subjects were living independently in communities. The 576 individuals who refused to participate in the survey were slightly older than the responders ( $73.3 \pm 8.9$  years,  $p < 0.01$ ) but had a comparable gender distribution to the responders (female = 55.8%,  $p = 0.16$ ). All subjects were fully informed of the study protocol and provided a written statement of informed consent that was signed by subjects or their legal guardians.

### 2.2. Design and assessments

The survey was conducted from February 2010 through February 2011. The current study employed a single-stage design to obtain estimates of the prevalence of suicidality. All subjects were invited to participate in the survey through door-to-door home visits.

We evaluated suicidal behaviors by using the suicidality module of the Mini-International Neuropsychiatric Interview (MINI) (Yoo et al., 2006). This module includes six questions: three questions on suicidal ideation within the past month ["Did you think you would be better off dead or wish you were dead?" (1 point), "Did you want to harm yourself?" (2 points), and "Did you think about suicide?" (6 points)], one question on suicide plans within the past month ["Did you have a suicide plan?" (10 points)], one question on suicide attempt within the past month ["Did you attempt suicide?" (10 points)], and one question on the history of lifetime suicide attempt ["In your lifetime, did you ever make a suicide attempt?" (4 points)]. The total score was used to classify

the current suicide risk into four levels as follows: none (0), low (1–5 points), moderate (6–9 points), and high (> 10 points).

We evaluated depressive symptoms by using the revised Korean version of the geriatric depression scale (GDS) and defined individuals scoring 16 or higher as having clinically significant current depression (sensitivity = 0.8200, specificity = 0.7811) (Kim et al., 2008). We assessed cognitive function by using the Korean version of the mini-mental state examination (MMSE) (Kim et al., 2010) and the subjective memory complaint questionnaire (Youn et al., 2009). We evaluated alcohol use using the Korean version of alcohol use disorders identification test (AUDIT) (Lee et al., 2000). We also evaluated the sociodemographic, lifestyle, and clinical characteristics listed in Table 1 by using a study-specific checklist. If the participant alone could not give enough information, reliable informants (spouse, child, other relatives, and close friends, in descending order) were interviewed as well. The study protocol was approved by the Institutional Review Board of the Seoul National University Bundang Hospital.

### 2.3. Statistical analysis

The prevalence of suicidal behaviors was estimated by age (i.e., 60–69 years, 70–79 years, and  $\geq 80$  years), gender, and education (i.e., uneducated, 1–6 years, and  $\geq 7$  years).

A 95% confidence interval (CI) was calculated for each prevalence estimate by using the Wald method. For cells that contained fewer than 100 subjects, CIs were derived using the exact methods for a binomial parameter. Standardized prevalence rates for elderly Koreans were estimated using the direct standardization method, wherein prevalence rates were adjusted by age and gender to the total Korean elderly population on the basis of the 2010 National Census. Descriptive statistics were compared between groups by using a student's *t* test, analysis of variance (ANOVA), or chi-square test. To identify the factors associated with a risk of suicidal behaviors, we employed univariate and multivariate multinomial logistic regression models. All statistical analyses were performed using the SPSS 17.0 statistical package.

## 3. Results

### 3.1. Prevalence of suicidal behaviors

No current suicide risk was found in 607 of the participants. Of the remaining participants, the risk was low in 152, moderate in 54, and high in 35. Among the 241 participants with suicide risk, 192 (79.7%) reported suicidal ideation at the examination. Among them, 17 had a suicide plan and one had attempted suicide within a month. The characteristics of the participants are summarized in Table 1.

As shown in Table 2, 80 (9.5%) had attempted suicide once or more in their lifetime. The prevalence rate of lifetime suicide attempt gradually increased with advancing age. This age-dependent increase in lifetime suicide attempts was statistically significant ( $t = 27.01$ ,  $p = 0.02$ ). The age- and gender-standardized prevalence rate of lifetime suicide attempt was estimated as 9.2% (95% CI = 7.3–11.2) in elderly Koreans.

The one-month-point prevalence of suicidal ideation without a plan or attempt was 20.5% (95% CI = 17.8–23.2), and that of suicidal ideation with a plan or attempt was 2.25% (95% CI = 1.3–3.3). Overall, one-month prevalence of suicidal ideation was 22.6% (95% CI = 19.8–25.4). The one-month prevalence rate of suicide attempt was 0.12% (95% CI = 0–0.4). The prevalence of suicidal ideation without a plan or attempt increased with advancing age and was higher in women and less-educated individuals. The prevalence of suicidal ideation with a plan or attempt, however, increased until participants were in their 70s and decreased thereafter, was higher

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