



## Feature Article

# Suicidal ideation and suicide attempts in older adults: Influences of chronic illness, functional limitations, and pain



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## ABSTRACT

This study aimed to examine the associations between suicidal behavior in older Korean adults and chronic illnesses, functional limitations, and pain. Data were obtained and analyzed for 8500 adults over 65 years of age from the 2007–2012 Korea National Health and Nutrition Examination Survey IV and V. Multivariate logistic regression analyses were conducted to examine the associations between suicidal behavior, chronic illness, functional limitations, and pain. The presence of arthritis and renal failure were significantly associated with a higher risk of suicidal ideation and suicide attempts. Moderate limitation in usual activities and extreme pain significantly increased the risk of both suicidal ideation and suicide attempts, over and above the existence of chronic illnesses and depression status.

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## Introduction

Suicide is a serious global public health problem. According to the report of the World Health Organization (2014), an estimated 804,000 suicide deaths occurred worldwide in 2012, representing an annual global age-standardized suicide rate of 11.4 per 100,000 people, and making suicide the 15th leading cause of death.<sup>1</sup> Although there is some variability across countries, suicide rates are highest in persons aged 70 years or over in almost all regions of the world,<sup>1</sup> which warrants attention to suicide in late life from health care providers.

In particular, older Korean adults are one of the most vulnerable populations to suicide; the suicide rate in this group has increased five-fold during the last two decades (about 70 per 100,000 in 2014).<sup>2</sup> While undergoing a rapid increase of the older population in a short period of time, Korean society has been unprepared for aging and has experienced weakening social integration and erosion of the traditional family support base for the elderly.<sup>3</sup> In the U.S., suicide rates in older adults have declined since 1991, after being consistently higher than younger age groups for the previous two decades.<sup>4</sup> However, as the “baby boom” cohort—a group with historically high rates of suicide—enters older adulthood, the rate of suicide in older adults is expected to rise again.<sup>5</sup>

The literature on suicide in late life has noted increased risk with depression, social isolation, physical illness, demographic characteristics of older age, low income, and the male gender.<sup>5</sup> In comparison to suicides in young and middle adulthood, typically associated with interpersonal discord, financial/job problems, and legal difficulties, physical illness and functional impairment have been explained as one of the most common stressors in older adults who commit suicide.<sup>5</sup> In fact, the burden of chronic illness is expected to increase substantially in the future worldwide, not only in advanced countries but also in developing countries.<sup>1</sup> Similar to the U.S., more than 80% of older adults in Korea have chronic diseases, which seriously compromise their quality of life.<sup>6,7</sup> Given that almost half of older adults who committed suicide had visited a health care provider in the preceding week,<sup>8</sup> health care assessment that identifies the impact of the chronic illness in terms of suicide risk may be useful for screening individuals at high risk.

Although the clinical guidelines for suicide prevention in older adults have emphasized increasing health care providers' awareness of patients' loss of body functions, and training such providers to screen for suicide risk,<sup>9</sup> the extent of increased risk of suicide with chronic illnesses and the impact on health status are unclear, particularly as related to functional impairment and pain in older adults.<sup>10</sup> In the literature, a high risk of suicide has been reported to be associated with specific medical conditions, such as asthma, cancer, congestive heart failure, epilepsy, and stroke, but the findings have been inconsistent across studies where the sample population consisted of multiple age groups, or depression was uncontrolled.<sup>9–12</sup> Functional impairment and pain also have been

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associated with increased risk of suicide,<sup>9,13</sup> but evidence has been insufficient to support the importance of functional limitations and pain, over and above depression and demographic characteristics.<sup>10</sup> A comprehensive examination of the effects of chronic illnesses as well as pain and functional limitations imposed by the illness, adjusting for depression and demographic variables, is necessary.

Therefore, it was hypothesized that the presence of chronic illnesses, functional limitations, and pain would have significant associations with suicidal behavior in older Korean adults, after controlling for depression and demographic characteristics. Because suicidal ideation and suicide attempts are significant and potent predictors of completed suicide, the present study focused on the risk factors of suicidal ideation and suicide attempts as measures of suicidal behavior.

## Methods

### *Design and study population*

The present study was conducted using data from the 2007–2012 Korea National Health and Nutrition Examination Survey (KNHANES) IV and V. Data from these two waves of the KNHANES survey were merged for the analysis in order to increase statistical power, given the low incidence of suicide attempts in the population during this period. Data for the KNHANES have been collected by the Korea Centers for Disease Control and Prevention every three or four years to provide national estimates of the health and nutritional status of community-dwelling Koreans.<sup>14</sup> The KNHANES uses a stratified multistage probability sample of region, gender, age, and average size and price of housing to represent the Korean population. As part of the KNHANES survey, respondents over 12 years of age were asked about suicidal ideation and suicide attempts. A total of 73% and 81% of eligible individuals completed the KNHANES IV and V, respectively. Of the 47,345 respondents who completed one of these two waves of the survey, respondents aged 65 or older were selected for this study. As a result, the final sample for the current analysis was 8500 adults over age 65, including 714 adults (8.4%) in 2007, 1488 (17.5%) in 2008, 1555 (18.3%) in 2009, 1555 (18.3%) in 2010, 1607 (18.9%) in 2011, and 1581 (18.6%) in 2012.

### *Measurements*

All measures in this study were administered at a mobile examination center, as part of the health survey of the KNHANES. The health survey was conducted with a structured interview schedule developed for the KNHANES. The KNHANES interviewers were trained for seven days on the content and practical manner of administering the health survey and interviewing.<sup>6</sup> The process of collecting data was checked by random site visits of the KNHANES executive team to maintain the data quality.<sup>6</sup> Suicidal ideation and suicide attempts were determined by responses (“yes” or “no”) to the following questions in the self-administered paper-and-pencil questionnaires: “Have you ever thought of committing suicide during the last 12 months?” and “Have you attempted suicide during the last 12 months?”

For the presence of chronic illness, participants were asked by the KNHANES interviewers whether they had any of the following illnesses: asthma, arthritis, cancer, diabetes, hypertension, ischemic heart disease, renal failure, stroke, or thyroid disease. The list of chronic physical conditions was selected to represent chronic illnesses that were both prevalent and associated with substantial morbidity in the Korean population.<sup>6,15</sup> The prevalence of major depression was also assessed by asking whether the individual had been diagnosed with depression by a physician. Functional limitations and pain were assessed by KNHANES interviewers via the

subscales of the Korean version of the EuroQoL (EQ)-5D.<sup>16</sup> Respondents were asked to rate their functional status in terms of mobility, self-care, and usual activities, and their pain/discomfort on a Likert-type scale ranging from 1 (no problem) to 3 (unable to perform or extreme pain). The physical dimensions (i.e., functional limitation, pain) of the Korean version of the EQ-5D have exhibited good validity and reliability in Korean patients.<sup>17</sup> Demographic information, including age, gender, income, and marital status, were also assessed in the interviews.

### *Ethical considerations*

This study utilized data from the KNHANES, which is a national database that does not contain any personal identifiable information. The author obtained permission for using KNHANES data from the Korea Centers for Disease Control and Prevention. Data were handled and processed as required by the code of conduct for scientific researchers.

### *Statistical analysis*

To ensure appropriate estimates and standard errors, sample weights indicated in the Korea Centers for Disease Control and Prevention (2014) guidelines were incorporated into the statistical analyses for the current study. According to the guidelines for statistical analysis,<sup>14</sup> sample weights, incorporating information on stratification and clustering of sampling design, selection rate, and response rates, were applied in the analysis to ensure appropriate estimates and standard errors to represent the national population. The prevalence of suicidal ideation, suicide attempts, and demographic characteristics were analyzed using descriptive statistics.

The associations between suicidal behavior and chronic illness, pain, and functional limitations were analyzed using multivariate logistic regression. Two regression models were developed, one for each dependent variable, namely suicidal ideation and suicide attempts, and each model included a series of predictor variables (the presence of each chronic illness and functional limitations of mobility, self-care, and usual activities) plus control variables (depression, age, income, sex, and marital status). An alpha level of 0.05 was selected for statistical significance. Statistical analyses were performed using SPSS 19.0 Complex Samples Procedures (SPSS, Inc., Chicago, IL, USA).

## Results

### *Characteristics of the sample*

Table 1 presents the characteristics of the sample. A total of 25.7% of the respondents reported suicidal ideation, and 1.4% had attempted suicide in the last 12 months. The rank order of illness frequency was as follows: hypertension, arthritis, diabetes, ischemic heart disease, asthma, stroke, thyroid disease, cancer, and renal failure. The prevalence of major depression was 4.8%.

### *Suicidal behavior and chronic illness, functional limitations, and pain*

The regression model for suicidal ideation showed that moderate and severe limitations in self-care and usual activities were associated with a higher risk of suicidal ideation (moderate limitations in self-care: OR 1.41, 95% CI [1.14, 1.75]; severe limitations in self-care: OR 2.37, 95% CI [1.38, 4.08]; moderate limitations in usual activities: OR 1.72, 95% CI [1.43, 2.07]; severe limitations in usual activities: OR 2.14, 95% CI [1.49, 3.06]) (Table 2). Additionally,

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