Gender-Specific Predictors of Suicidal Ideation Among Korean Older Adults: A 2-Year Prospective Study

Jiyoung Lyu¹, Yeon Ok Lim¹, and Young Bum Kim¹

Abstract
This study aimed at assessing gender-specific predictors associated with suicidal ideation among Korean older adults using a longitudinal study. Participants of this study were 926 older adults aged 65 years and above (583 women, 343 men) who completed both 2016 and 2018 surveys on Elderly Life Conditions in Chuncheon, Korea, and reported never having thought about suicide or attempted suicide at baseline. Multivariate logistic regression was used to investigate the predictors (at baseline) of suicidal ideation (at 2-year follow-up) separately for each gender group. The results showed that among women, predictors of suicidal ideation were fearlessness about death (personal factor), filial responsibility (family factor), and social activities (social factor). However, among men, only psychological inflexibility (personal factor) predicted suicidal ideation. Results of this study provide evidence for the need to adopt separate strategies for each gender, taking the different predictors of suicidal ideation into account in the development of suicide prevention programs for older adults in Korea.

Keywords
gender-specific predictors, suicidal ideation, ecological systems theory, Korean older adults

Introduction
Korea has one of the highest suicide rates in the world; between 2003 and 2016, Korea’s suicide rate was the highest among all the countries in the Organisation for Economic Co-operation and Development (OECD, 2018). In 2015, 25.8 persons out of every 100,000 Koreans died by suicide, which is the highest out of all the OECD countries and more than double the average of OECD countries (11.6 persons). Korea has ranked first in suicide rates for 14 consecutive years since 2003 (OECD, 2018).

Since Korea became an aging society, the suicide rate among older adults aged 65 years and above was found to be staggeringly high, and thus became a very serious social issue. According to the Korean death statistics in 2017, the death rate by suicide among older Koreans aged 80 years and above was at its peak of 70.0 persons for every 100,000 persons (Statistics Korea, 2018). Moreover, elderly suicide rate in Korea was 3.2 times the average of OECD countries (Korea Suicide Prevention Center, 2018).

When analyzed according to gender, the suicide rate was 34.9 in men and 13.8 in women per 100,000 in 2017, which showed that the suicide rate among men was 2.5 times higher than that of women (Statistics Korea, 2018). The gender gap was found to be even larger in older age groups; for every 100,000, the suicide rate among older adults aged 65 years and above was 78.9 for men, which was 3.2 times higher than 24.7 for women (Statistics Korea, 2018).

All these statistics undeniably demonstrate that the suicide rate is extremely high among older adults in Korea, even more so for males, and that suicide will inevitably become a serious issue in Korean society as it becomes an aged society. Several suicide prevention measures have been implemented in Korea, but more individuals die as a result of suicide, and many efforts are now being made to identify the factors that impact elderly suicide from various perspectives (Choi et al., 2009; M. R. Kim, 2010; K. T. Kim et al., 2011; Lee, 2010; Lee & Lyu, 2017).

Elderly suicide can be explained from different perspectives, such as psychological (Baumeister, 1990; Freud, 1957; Joiner, 2005; Menninger, 1933; Shneidman, 1993), sociological (Cowgill, 1974; Durkheim, 1951), and biological (Jamison, 1999; Mann, 2003). However, suicide is not just the result of a personal decision but is also influenced by socially integrated factors and rules (Lee & Lyu, 2017). Therefore, it is necessary to consider ecological systems (Bronfenbrenner, 1979). Ecological systems evaluate individuals’ psychological and social environment, which provides the opportunity to assess personal, family, and socio-environmental factors (Kemp, 1998).
Based on previous studies, personal factors such as depression (Alexopoulos, 2005), psychological inflexibility (Spinhoven et al., 2014), fearlessness about death (Cicirelli et al., 2000), self-rated health (McIntosh, 1995), chronic diseases (Shin & Baek, 2013), alcohol problem (Waern, 2003), smoking habits (H. K. Kim, Ko, & Chung, 2010), and sociodemographic characteristics (K. H. Kim, Kim, et al., 2010; Lee & Lyu, 2017; Shin & Baek, 2013) are associated with suicidal ideation. In terms of factors at the family level, studies have shown that marital status (Yen et al., 2005), living arrangement (K. T. Kim et al., 2011), family solidarity (H. S. Kim, 2002), and filial responsibility (Simon et al., 2014) are factors related to suicidal ideation. At the social level, social support (Rowe et al., 2006), social activities (Lee & Lyu, 2017), and place of residence (Li et al., 2009) are included as factors associated with suicidal ideation.

However, most studies have examined factors that influence suicidal ideation among older adults by defining them as a homogeneous group, and very few studies have assessed these factors according to gender (H. S. Kim et al., 2013; Koo et al., 2014; Lee, 2013). In general, suicidal ideation and suicide attempts are higher among women, but the actual suicide rate is higher among men (Bae, 2004). Canetto and Sakinofsky (1998) found gender differences in suicide as a reflection of sociocultural influences on suicide methods and intentions, whereas Fung and Chan (2011) revealed gender differences in the factors that influence suicidal behaviors among older adults. Therefore, it is necessary to assess predictors of suicidal ideation among Korean older adults according to gender.

Furthermore, the majority of the previous studies that examined the factors influencing suicidal ideation among older adults are cross-sectional, and thus are unable to properly explain causal relationships (H. S. Kim, 2002; H. K. Kim et al., 2010; K. H. Kim, Kim, et al., 2010; Park et al., 2014). A regression analysis in a cross-sectional design has a limitation because it can only make assumptions regarding positive correlations between variables from a specific perspective. Therefore, it is important to examine the influencing factors that precede suicidal ideation by using a longitudinal study which ensures a cause and effect.

Hence, this study aimed to examine predictors of suicidal ideation among male and female older adults at personal, family, and social levels based on ecological systems theory. To this end, this study used panel data from the 2016 and 2018 surveys on Elderly Life Conditions in Chuncheon, Korea. The survey respondents were community-dwelling older adults aged 65 years and above living in the Chuncheon area, who were selected using a proportional allocation sampling method based on gender and age distribution from 1 eup (town), 9 myeon (townships), and 15 dong (neighborhoods) in Chuncheon area. The survey used face-to-face interviews based on structured questionnaires. Of the 1,089 respondents who completed both the 2016 and 2018 surveys, 926 who reported never having thought about suicide or attempted suicide in the 2016 survey were included in the analysis (583 women, 343 men).

**Measures**

**Suicidal ideation.** In this study, suicidal ideation was measured by the question, “Have you ever thought about or attempted to kill yourself?” If subjects answered “Never,” they were given 0 point. If subjects ever had suicidal thoughts, plan, or attempts, they were given 1 point.

**Personal factors.** Symptoms of depression were measured using the Short-Form Geriatric Depression Scale (SGDS), which was developed by Yesavage et al. (1982). The SGDS included 15 yes/no questions, and five of them were scored in reverse. “Yes” was scored as 1 and “No” as 0. The score of all 15 questions was added up to provide the total score, which ranged from 0 to 15. Cronbach’s alpha was .897 for this scale. Psychological inflexibility was measured using the Acceptance Action Questionnaire II (Heo et al., 2009). It contained seven questions rated on a 5-point Likert-type scale from 1 to 5, and the total score was the sum of all question scores. A higher score indicated higher psychological inflexibility. Cronbach’s alpha was .894 for this scale. Fearlessness about death was measured using the Acquired Capability for Suicide Scale–Fearlessness About Death (Ribeiro et al., 2014). It contained seven questions rated on a 5-point Likert-type scale from 0 to 4. Three questions were scored in reverse, and the total score was the sum of all seven scores. A higher score implied greater levels of fearlessness about death. Cronbach’s alpha was .908 for this scale. Subjective health status, which was used to assess the participants’ perception of their current overall health status, was measured on a 5-point scale ranging from 1 (I am very unhealthy) to 5 (I am very healthy). To assess chronic conditions, respondents reported the number of physician-diagnosed diseases from a list of 18 diseases. Alcohol problem was measured with three questions from the Alcohol Use Disorders Identification Test (Bush et al., 1998), measured on a Likert-type scale from 0 to 4. The total sum score of the three questions was used. A higher score indicated severe drinking problems. Cronbach’s alpha was .946 for these three questions. For smoking status, they were given 1 point if they answered, “I currently smoke” and 0 point if they answered, “I used to smoke in the past” or “I do not smoke.”

Regarding sociodemographic variables, gender was divided into female and male; education level was measured based on the number of years completed at school; for religion, having any religion was scored as 1 and not having any

**Method**

**Study Sample**

The data used in this study were taken from the 2016 and 2018 surveys on Elderly Life Conditions in Chuncheon, Korea. The survey respondents were community-dwelling older adults aged 65 years and above living in the Chuncheon area, who were selected using a proportional allocation sampling method based on gender and age distribution from 1 eup (town), 9 myeon (townships), and 15 dong (neighborhoods) in Chuncheon area. The survey used face-to-face interviews based on structured questionnaires. Of the 1,089 respondents who completed both the 2016 and 2018 surveys, 926 who reported never having thought about suicide or attempted suicide in the 2016 survey were included in the analysis (583 women, 343 men).
as 0; beneficiary was measured using a dummy variable, namely, receiving national assistance.

**Family factors.** For marital status, being married was scored as 1 and separated/divorced/widowed/never married as 0. Living arrangement was measured using a dummy variable, namely, living alone. Family solidarity was measured using four questions from the Reasons for Living Scale–Older Adult version (RFL-OA), developed by Edelstein et al. (2009). The questions were rated on a 6-point Likert-type scale from 1 to 6, and the total sum score of the four questions was used. A higher score indicated stronger family solidarity. Cronbach’s alpha for the four questions was .918. Sense of filial responsibility was measured through Filial Responsibility Expectations developed by Seelbach (1978). Six questions were rated on a Likert-type scale from 1 to 5, and the total score was the sum of all six question scores, with a higher score indicating a stronger sense of filial responsibility. Cronbach’s alpha for the six questions was .862.

**Social factors.** Social support was measured separately as emotional support, physical support, and financial support. Each type of social support was measured using six questions regarding resources given and received between the respondents and their spouse, children, and friends. Each question was rated from 1 to 5 according to frequency. If respondents answered “Not Applicable,” it was regarded as system missing. The score for each type of social support was the average value of the six questions. A high score indicated higher social support. Cronbach’s alpha was .791 for emotional support, .708 for physical support, and .683 for financial support. Social activities were measured based on the number of activities respondents participated in from a list of 18 group activities. The place of residence was measured using a dummy variable, namely, rural areas.

**Statistical Analysis**

Data were analyzed according to gender. First, descriptive statistics were conducted to examine respondents’ characteristics. Second, t-tests or chi-square tests were conducted to examine gender differences between the study variables. Third, multivariate logistic regression analyses were conducted to investigate the predictors (at baseline) of suicidal ideation (at 2-year follow-up). Finally, statistical gender differences in the relationship between baseline predictors and suicidal ideation at follow-up were also evaluated using t-statistics for regression coefficients (Paternoster et al., 1998). All analyses were performed using SPSS 25.0 for Windows.

**Results**

**Descriptive Statistics**

Table 1 includes the descriptive statistics of the study sample at baseline (year 2016) (N = 926). The incidence of suicidal ideation in 2018 was 11.3% among women and 9.3% among men, but a significant difference was not found (p = .342). Compared with men, women had more symptoms of depression (p = .012), were more psychologically inflexible (p = .001), had less fearlessness about death (p = .001), had worse self-rated health (p < .001), had more chronic conditions (p < .001), had less alcohol problems (p < .001), were less educated (p < .001), were less likely to be married (p < .001), were more likely to live alone (p < .001), had less family solidarity (p = .007), had less economic support (p < .001), and were less likely to be engaged in social activities (p < .001).

**Logistic Regression Results**

Table 2 presents the logistic regression results that identify the predictors of suicidal ideation at 2-year follow-up. Among women, fearlessness about death (odd ratio [OR] = 1.06, p < .05), filial responsibility (OR = 1.08, p < .05), and engaging in social activities (OR = 0.69, p < .05) were significantly associated with suicidal ideation at follow-up controlling for other factors. In contrast, psychological inflexibility (OR = 1.13, p < .05) was the only significant predictor of suicidal ideation at follow-up among men. In terms of gender differences, none of the association between baseline predictors and suicidal ideation was statistically significant.

**Discussion**

This study was designed to examine the gender-specific incidence and predictors of suicidal ideation among community-dwelling older Koreans within 2 years according to ecological systems theory. Women had a higher incidence of suicidal ideation than men at 2-year follow-up, but a significant difference was not found. Logistic regression results showed that different factors were associated with suicidal ideation according to gender. For females, predictors of suicidal ideation were fearlessness about death (personal factor), filial responsibility (family factor), and social activities (social factor); thus, suicidal ideation occurred in all levels of ecological systems. However, for males, the only predictor of suicidal ideation was psychological inflexibility (personal factor); hence, it is necessary to focus on the personal level of ecological systems.

Older women were more likely to have suicidal ideation if they had a higher level of fearlessness about death. In this study, female participants were more likely to have experienced spousal death than male participants. As women are believed to cope better with spousal bereavement (Bennett et al., 2003), the level of fearlessness about death might be high among older widowed women. However, older women who lose a spouse to death will have more financial difficulties (Heinemann & Evans, 1990) and difficulties with physical adjustments (Joung et al., 1995) compared with older men, which is highly likely to lead to suicidal ideation.
Table 1. Sample Characteristics by Gender at Baseline Year 2016 (N = 926).

| Variables                              | Female (n = 583) | Male (n = 343) | p value |
|----------------------------------------|-----------------|----------------|---------|
| **Dependent variable**                 |                 |                |         |
| Suicidal ideation at 2018              | 11.3%           | 9.3%           | .342    |
| **Personal factors**                   |                 |                |         |
| Symptoms of depression (0–15)          | 2.2             | 1.7            | .012    |
| Psychological inflexibility (7–35)     | 13.3            | 12.3           | .001    |
| Fearlessness about death (0–28)        | 18.7            | 20.1           | .001    |
| Self-rated health (1–5)                | 2.8             | 3.4            | <.001   |
| Chronic conditions (0–18)              | 2.6             | 1.8            | <.001   |
| Alcohol problem (0–12)                 | 0.8             | 3.4            | <.001   |
| Currently smoking                      | 2.7%            | 19.2%          | <.001   |
| Age (65–94)                            | 76.5            | 74.7           | <.001   |
| Education year (0–20)                  | 5.2             | 9.1            | <.001   |
| Have religion                          | 63.0%           | 48.1%          | <.001   |
| **Family factors**                     |                 |                |         |
| Married                                | 33.3%           | 83.7%          | <.001   |
| Living alone                           | 42.9%           | 12.2%          | <.001   |
| Family solidarity (4–24)               | 19.7            | 20.4           | .007    |
| Filial responsibility (6–30)           | 20.0            | 19.9           | .637    |
| **Social factors**                     |                 |                |         |
| Emotional support (1–5)                | 3.7             | 3.7            | .925    |
| Physical support (1–5)                 | 3.1             | 3.2            | .105    |
| Economic support (1–5)                 | 2.9             | 3.3            | <.001   |
| Social Activities (0–18)               | 2.0             | 2.7            | <.001   |
| Rural                                  | 26.6%           | 36.2%          | .003    |

Table 2. Gender-Specific Predictors of Suicidal Ideation at Follow-Up Year 2018.

| Variables                              | Female (n = 583) | Male (n = 343) | OR (95% CI) |
|----------------------------------------|-----------------|----------------|-------------|
| **Personal factors**                   |                 |                |             |
| Symptoms of depression                 | 1.05 [0.95, 1.15] | 0.92 [0.79, 1.08] |             |
| Psychological inflexibility            | 1.00 [0.92, 1.09] | 1.13 [1.01, 1.27] |             |
| Fearlessness about death               | 1.06 [1.01, 1.11] | 0.99 [0.93, 1.06] |             |
| Self-rated health                      | 0.87 [0.63, 1.21] | 1.06 [0.67, 1.65] |             |
| Chronic conditions                     | 0.95 [0.78, 1.15] | 0.98 [0.69, 1.37] |             |
| Alcohol problem                        | 1.07 [0.94, 1.21] | 1.05 [0.95, 1.16] |             |
| Currently smoking                      | 0.51 [0.06, 4.16] | 0.67 [0.24, 1.92] |             |
| Age                                    | 1.00 [0.95, 1.05] | 1.00 [0.92, 1.09] |             |
| Education year                         | 1.09 [1.00, 1.18] | 0.98 [0.89, 1.08] |             |
| Have religion                          | 1.20 [0.63, 2.31] | 0.85 [0.35, 2.04] |             |
| Beneficiary                            | 1.10 [0.45, 2.65] | 1.56 [0.43, 5.71] |             |
| **Family factors**                     |                 |                |             |
| Married                                | 0.70 [0.31, 1.56] | 0.32 [0.06, 1.60] |             |
| Living alone                           | 0.86 [0.44, 1.67] | 0.28 [0.04, 1.90] |             |
| Family solidarity                      | 1.07 [0.96, 1.18] | 0.95 [0.81, 1.10] |             |
| Filial responsibility                  | 1.08 [1.01, 1.15] | 1.02 [0.93, 1.13] |             |
| **Social factors**                     |                 |                |             |
| Emotional support                      | 0.90 [0.53, 1.52] | 0.43 [0.16, 1.14] |             |
| Physical support                       | 0.82 [0.48, 1.41] | 1.15 [0.45, 2.96] |             |

(continued)
Moreover, females with a higher sense of filial responsibility were more likely to experience suicidal ideation, and this may be a result of the considerable burden of their gender role as daughter-in-law and mother, which is common for females in this sandwich generation in the Korean patriarchal social structure (Han & Hong, 2011). In other words, even though they dedicated themselves to their elderly parents, they feel a sense of isolation from their children due to changes in family function through industrialization, which may lead to suicidal ideation (Simon et al., 2014).

However, participating in various group activities was found to be a protective factor decreasing suicidal ideation among females. In general, men in Korean society may perform their social roles through participating in various group activities, whereas women perform their given roles in the family rather than in society (Kang et al., 2019). Therefore, females who participate in various group activities can receive social support through interacting with others outside of the family, which may help reduce suicidal ideation (H. S. Kim, 2002).

On the contrary, psychological inflexibility was found to be a risk factor of suicidal ideation in males. This is consistent with a previous study which revealed that men are vulnerable to depression or anxiety than women if they have a high level of psychological inflexibility (Wilhelm et al., 2002). Because Korean men are particularly more prone to becoming emotionally isolated or socially diminished in situations that are difficult to handle, this may lead to suicidal ideation to escape these situations (H. S. Kim, 2017).

Although these interesting findings, this study has the following limitations. First, suicidal ideation was measured through a single questionnaire and dichotomized; thus, it is unable to fully assess its level or severity. Second, although the variables in this study were determined based on ecological systems theory, other external variables that may influence suicidal ideation among older adults were not fully considered. Third, several measurements used in this study were created outside South Korea. Therefore, the result should be interpreted more carefully considering cultural differences.

**Conclusion**

Although this study has several limitations, findings from this study have implications for research, practice, and public policy. First, this study holds significance in that it examined predictors of suicidal ideation among older adults through a longitudinal design revealing causal relationships. Second, by determining predictors of suicidal ideation according to ecological systems theory, we can propose ways to manage elderly suicide prevention from various angles. Finally, by identifying suicidal ideation factors according to gender in this older population, this study highlights the need for suicide prevention programs that are designed and implemented taking gender perspectives into consideration.

**Declaration of Conflicting Interests**

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

**Funding**

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This work was supported by the National Research Foundation of Korea Grant funded by the Korean Government (NRF-2012S1A6A3A01033504). This work was also supported by the Hallym Leading Research Group Support Program of 2017 (HRF-LGR-2017-0005).

**Ethics Statement**

Ethical approval was sought and granted from the Institutional Review Board of Hallym University (HIRB-2016-010).

**ORCID iD**

Jiyoung Lyu [](https://orcid.org/0000-0002-7228-4212)

**References**

Alexopoulos, G. S. (2005). Depression in the elderly. *The Lancet, 365*(9475), 1961–1970.

Bae, J. Y. (2004). Case study about elderly suicide. *Journal of Welfare for the Aged Institute, 23*, 65–82.

Baumeister, R. F. (1990). Suicide as escape from self. *Psychological Review, 97*, 90–113.
Rowe, J. L., Conwell, Y., Schulberg, H. C., & Bruce, M. L. (2006). Social support and suicidal ideation in older adults using home healthcare services. *The American Journal of Geriatric Psychiatry, 14*(9), 758–766.

Seelbach, W. C. (1978). Correlates of aged parents’ filial responsibility expectations and realizations. *Family Coordinator, 27*(4), 341–350.

Shin, J., & Baek, S. (2013). Factors affecting suicidal ideation in elderly attending community senior centers. *Journal of Agricultural Medicine and Community Health, 38*(2), 71–84.

Shneidman, E. S. (1993). *Suicide as psychache: A clinical approach to self-destructive behavior*. Jason Aronson.

Simon, M. A., Chen, R., Chang, E. S., & Dong, X. (2014). The association between filial piety and suicidal ideation: Findings from a community-dwelling Chinese aging population. *Journals of Gerontology Series A: Biomedical Sciences and Medical Sciences, 69*(Suppl. 2), S90–S97.

Spinhoven, P., Drost, J., de Rooij, M., van Hemert, A. M., & Penninx, B. W. (2014). A longitudinal study of experiential avoidance in emotional disorders. *Behavior Therapy, 45*(6), 840–850.

Statistics Korea. (2018). *Causes of death statistics in 2017*. http://kostat.go.kr

Waern, M. (2003). Alcohol dependence and misuse in elderly suicides. *Alcohol and Alcoholism, 38*(3), 249–254.

Wilhelm, K., Roy, K., Mitchell, P., Brownhill, S., & Parker, G. (2002). Gender differences in depression risk and coping factors in a clinical sample. *Acta Psychiatrica Scandinavica, 106*(1), 45–53.

Yen, Y. C., Yang, M. J., Yang, M. S., Lung, F. W., Shih, C. H., Hahn, C. Y., & Lo, H. Y. (2005). Suicidal ideation and associated factors among community-dwelling elders in Taiwan. *Psychiatry and Clinical Neurosciences, 59*(4), 365–371.

Yesavage, J. A., Brink, T. L., Rose, T. L., Lum, O., Huang, V., Adey, M., & Leirer, V. O. (1982). Development and validation of a geriatric depression screening scale: A preliminary report. *Journal of Psychiatric Research, 17*(1), 37–49.