Impacts of Remaining Single above the Mean Marriage Age on Mental Disorders and Suicidality: a Nationwide Study in Korea

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ABSTRACT

Background: This study investigated the impact of getting older than the mean marriage age on mental disorders and suicidality among never-married people.

Methods: We performed an epidemiological survey, a nationwide study of mental disorders, in 2016. In this study, a multi-stage cluster sampling was adopted. The Korean version of the Composite International Diagnostic Interview was conducted with 5,102 respondents aged 18 years or above. The associations between never-married status, mental disorders, and suicidality were explored according to whether the mean age of first marriage (men = 32.8 years; women = 30.1 years) had passed.

Results: Never-married status over the mean marriage age was associated with agoraphobia, obsessive–compulsive disorder, mood disorders, and major depressive disorder after adjusting for sociodemographic factors. Respondents with never-married status above the mean marriage age were associated with suicide attempts (adjusted odds ratio [aOR], 3.21; 95% confidence interval [CI], 1.36–7.60) after controlling for sociodemographic factors and lifetime prevalence of mental disorders, while respondents with never-married status under the mean marriage age were not. Moreover, in respondents with never-married status, getting older than the mean marriage age was associated with suicidal ideations (aOR, 1.49; 95% CI, 1.04–2.15) and suicide attempts (aOR, 3.38; 95% CI, 1.46–7.84) after controlling for sociodemographic factors and lifetime prevalence of mental disorders.

Conclusion: Never-married status above the mean first marriage age was associated with mental disorders and suicidality. These findings suggest the need for a national strategy to develop an environment where people with never-married status do not suffer even if their marriage is delayed.

Keywords: Marriage; Single Person; Mental Disorders; Suicide; Cross-sectional Studies

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INTRODUCTION

In Korea, low birthrate is now emerging as a serious social problem, and the tendency toward late marriage is considered to be the cause of this phenomenon. The tendency to postpone marriage is continuously strengthened due to various economic, social, and cultural factors. As a result, the age with respect to first marriage continues to increase. In accordance with the population trend survey of the Korea National Statistical Office, the mean first marriage age for men increased from 29.3 years in 2000 to 32.9 years in 2016 while the mean first marriage age for women increased from 26.5 years to 30.1 years during the same period.\(^1\)

Through several studies based on the positive effects of maintaining one’s marital status on health,\(^2,3\) we can infer the negative effects of never-married status. Married people were found to have lower psychological stress and greater life satisfaction than never-married people\(^4,5\); moreover, married people were observed to have better health conditions than never-married people when examined for various diseases including mental disorders, suicide risks, and mortality.\(^6\) The Organisation for Economic Co-operation and Development’s (OECD) estimated that Korea’s suicide rate is more than twice as high as the OECD countries’ average suicide rate.\(^12\) Additionally, the annual social cost of suicide in Korea was about 6.5 trillion won in 2014, and the impact of suicide on the Korean society is very serious.\(^13\) To reduce the suicide rate, it is important to screen and prevent suicide by considering various risk factors.

Marriage seems to have several positive effects. First, the roles of spouses in marriage form a major component in shaping an adulthood identity, and married people receive social and psychological support from their families.\(^14\) Second, sharing economic resources with a spouse increases access to health care and reduces stress associated with financial issues;\(^4\) married people tend to do less harm to their health than never-married people. In addition to these protective effects of marriage, positive aspects are explained through the selective effect that healthy people are more prone to get and stay married, but unhealthy people are less prone to get married or may be separated, divorced, or experiencing bereavement status.\(^4,6,15\)

Due to the worsening of the overall employment situation in recent years, men and women of marriageable age are delaying marriage, as they cannot afford to get married;\(^16\) in addition, there is anxiety about bearing and raising children in the future.\(^16\) However, the expectation of marriage by parents or people around them causes significant stress, and the extent of interpersonal relations decreases as their friends and acquaintances start getting married. These changes often occur as the age of never-married people passes the mean marriage age. Additionally, a prejudice that there is something wrong with never-married people above the marriageable age damages their self-esteem.\(^17\) Therefore, maintaining their never-married status beyond the mean marriage age could be a psychological burden for many people.

To date, many studies have explored the association of never-married status with mental health;\(^22\) however, no study has scrutinized the impact of diverse status in never-married people, i.e., getting older than mean marriage age, on mental health. From the public health viewpoint, establishing a risk factor for a disease and mortality is very crucial. This study investigated the impact of getting older than the mean marriage age alone on mental disorders and suicidality.
METHODS

Participants
We conducted a nationwide study of mental disorders, the Korean Epidemiologic Catchment Area Study-2016 (KECA-2016), from April to November in 2016. We employed a stratified multistage cluster sampling method to select respondents, which was based on the 2010 census of population and housing data in Korea.

From 21 community catchment areas throughout the country, we extracted the sample of the respondents. Primary and secondary sampling units (Si/Gun/Gu and Eup/Myeon/Dong, respectively, in Korean) were considered as the administrative regions. Tertiary sampling units were developed for the official announcement of statistics, and the size of which were about one-thirtieth of the size of Eup/Myeon/Dong. Chunks representing the quaternary sampling units consisted of 24 households. Finally, a segment selected from each chunk through systematic sampling methods composed four households and represented the ultimate sampling units. Employing the last-birthday method, we selected and interviewed one person per household. In total, 147 interviewers took a training session over five-days in accordance with the standard protocols developed by the World Health Organization (WHO). Interviews were performed face to face with 5,102 subjects aged over 18 years old living in the community. In this study, we defined the mean marriage age, i.e., the mean age of first marriage (men = 32.8 years; women = 30.1 years), according to the 2016 population trend survey of Korea National Statistical Office.

Assessment of sociodemographic factors
We gathered the data on sociodemographic factors during interviews: marital status (separated, divorced, or widowed/never married/married), age, gender (men/women), number of years of education (less than 12 years/more than 13 years), employment status (employed/unemployed), area of residence (urban/rural), living arrangement (alone/not alone), and average monthly household income (≤ 2,000,000 Korean won [KRW]/2,000,000–4,000,000 KRW/≥ 4,000,000 KRW).

Assessment of the mental disorders
The KECA-2016 employed the Korean version of the Composite International Diagnostic Interview 2.1 (K-CIDI) for assessing the mental health. The CIDI 2.1 was a standardized diagnostic tool, and a structured interview that could be applied by trained general people. It was translated into Korean in accordance with the WHO guidelines. Moreover, K-CIDI has been previously verified in terms of reliability and validity by Cho et al.

We evaluated the mental disorders using the Diagnostic and Statistical Manual of Mental Disorders, fourth edition classification in the KECA-2016. The mental disorders assessed in this study were psychotic disorders (delusional disorder, brief psychotic disorder, schizoaffective disorder, schizophreniform disorder, and schizophrenia), mood disorders (bipolar disorder, dysthymic disorder, major depressive disorder), nicotine use disorders (nicotine withdrawal and nicotine dependence), anxiety disorders (post-traumatic stress disorder, generalized anxiety disorder [GAD], specific phobia, agoraphobia, panic disorder, social phobia, obsessive–compulsive disorder [OCD]) and alcohol use disorders (alcohol dependence and alcohol abuse).
Assessment of the suicidal ideations, intentions, and attempts

We assessed suicidality employing the modified Suicide Prevention Multisite Intervention Study on Suicidal Behaviors that was devised by the WHO. We conducted assessment using the following three questions. “Have you ever seriously thought about committing suicide?” was the question used to assess lifetime suicidal ideations; “Have you ever made a plan for committing suicide?” was the question used to assess lifetime suicide plans; “Have you ever attempted suicide?” was the question used to assess lifetime suicide attempts.

Statistical analysis

We assigned the standardized weighted values to approximate the national population regarding gender and age, for each respondent, using the 2015 census of Korea National Statistical Office. We conducted Pearson’s $\chi^2$ test to compare gender, number of years of education, area of residence, employment status, and household income between groups. An independent $t$-test was employed to compare ages between groups. We conducted logistic regression analyses to assess the effect of sociodemographic factors on never-married status. To calculate the odds ratios (ORs) and 95% confidence intervals (CIs) for mental disorders and suicidality, we conducted logistic regression analyses using the never-married status as the independent variable after adjustment for age, gender, number of years of education, employment status, area of residence, living arrangement, and household income in both above- and under-the-mean-marriage-age groups. In the suicidality, we conducted additional analyses with adjustments for sociodemographic factors and mental disorders. For the never-married group, we additionally analyzed ORs of mental disorder and suicidality for those who are above the mean marriage age compared with those who are under the mean marriage age. In addition, we divided never-married people above the mean marriage age into two groups (younger old/older old) based on the median age of the above the mean marriage age group in the study sample (men = 40.0 years; women = 37.0 years) and scrutinized attendant risks of mental disorder and suicidality for each group because social norms for the age of older unmarried men and older unmarried women are higher than the mean marriage age. Furthermore, the older-old group is supposedly more likely to be under greater social pressure to marry, resulting in greater psychological burden. We investigated ORs of mental disorders and suicidality using each above-the-mean-marriage-age group (younger-old/older-old) as the independent variable with the under-the-mean-marriage-age group as the reference group. Instead of having separate groups for individual psychotic disorders, we categorized them all under the “psychotic disorders” group in the analyses, as there were very few respondents diagnosed with each disorder. All statistical analyses were executed employing SPSS version 25.0 for Windows software (IBM Co., Armonk, NY, USA). In this study, for all analyses, $P$ values of $<0.05$ were regarded as statistically significant.

Ethics statement

The Institutional Review Board of Samsung Seoul Hospital permitted this study (approval No. 2016-05-014). Informed written consent was provided by each participant before participation.

RESULTS

Descriptive statistics

Of 5,102 respondents, we recruited 3,665 respondents who are married or have never been married (excluding statuses such as widowed, divorced, or separated). Table 1 exhibits the
sociodemographic characteristics of study participants. The sociodemographic factors associated with the never-married status varied depending on above- or under-the-mean-marrige-age (Table 2). Never-married people above the mean marriage age accounted for 6.4% of Korea’s general population. Factors such as younger age, men, urban residence, living alone, and lower household income (less than 2,000,000 KRW) were associated with increased OR for never-married status in the group above the mean marriage age. People who have never been married and are under the mean marriage age accounted for 19.5% of Korea’s general population. Factors such as younger age, men, more number of years of education (more than 13 years), living alone, and low household income (less than 2,000,000 KRW) were associated with increased OR for never-married status among the respondents in the group under the mean marriage age.

Association of marital status with mental disorders
Table 3 demonstrates the prevalence and ORs of mental disorders in never-married people compared with married people. In the group above the mean marriage age, people who have never been married were more likely to have agoraphobia (adjusted OR [aOR], 6.95; 95% CI, 1.57–30.66), OCD (aOR, 5.45; 95% CI, 1.63–18.20), mood disorders (aOR, 2.06; 95% CI, 1.11–3.84), and major depressive disorder (aOR, 2.31; 95% CI, 1.24–4.28) when controlling for sociodemographic factors. On the contrary, in the group under the mean marriage age, people who have never been married were less likely to have GAD (aOR, 0.06; 95% CI, 0.01–0.37), alcohol use disorders (aOR, 0.54; 95% CI, 0.29–1.00), and alcohol dependence (aOR, 0.38; 95% CI, 0.16–0.91).

Association of the marital status with suicidality
The prevalence and ORs of suicidality in never-married people compared with married people are exhibited in Table 4. About 22.1%, 5.5%, and 5.6% of the never-married people...
above the mean marriage age reported the experience of suicidal ideations, suicide plans, and suicide attempts, respectively. This prevalence was significantly higher than that of married people (14.1%, 2.1%, and 1.8%, respectively). When we considered the people above 6/14

Table 2. Results of logistic regression of sociodemographic factors associated with never-married people

| Variables                        | Above the mean age of first marriage* | Under the mean age of first marriage* |
|----------------------------------|---------------------------------------|--------------------------------------|
|                                  | OR (95% CI)*                           | OR (95% CI)*                          |
| Age                              | 0.88 (0.87–0.90)**                    | 0.44 (0.38–0.51)**                   |
| Gender                           |                                       |                                      |
| Men                              | 1.81 (1.32–2.48)**                    | 10.34 (5.50–19.44)**                 |
| Women                            |                                       |                                      |
| Education, yr                    |                                       |                                      |
| ≤ 12                             |                                       |                                       |
| ≥ 13                             | 6.80 (2.98–15.50)**                   |                                       |
| Area of residence                |                                       |                                      |
| Urban                            | 1.50 (1.05–2.15)*                     |                                       |
| Rural                            |                                       |                                       |
| Employment                       |                                       |                                      |
| Employed                         |                                       |                                       |
| Unemployed                       |                                       |                                       |
| Living arrangement               |                                       |                                      |
| Alone                            | 25.38 (16.17–39.83)**                 | 43.23 (8.42–222.09)**                |
| Not alone                        | 1                                     | 1                                    |
| Household income, KRW†           |                                       |                                       |
| ≤ 2,000,000                      | 7.28 (4.75–11.16)**                   | 2.28 (1.03–5.06)*                    |
| 2,000,000–4,000,000              | 1.59 (1.09–2.34)*                     | 0.84 (0.48–1.48)                     |
| ≥ 4,000,000                      | 1                                     |                                       |

OR = odds ratio, CI = confidence interval, KRW = Korean won.
*P < 0.05, **P < 0.001.
*The mean age of first marriage was 32.8 years for men and 30.1 years for women, according to the data from the 2016 population trend survey of Korea National Statistical Office; †After controlling for other sociodemographic factors in multiple logistic regression analyses with a backward stepwise method; ‡1 US dollar = 1,133.89 KRW at the time of survey.

Table 3. Prevalence and ORs of mental disorders in never-married people compared with married people

| Mental disorders                  | Above the mean age of first marriage* | Under the mean age of first marriage* |
|-----------------------------------|---------------------------------------|--------------------------------------|
|                                   | Never-married (n = 260) | Married (n = 2,694) | OR (95% CI)* | P value | Never-married (n = 602) | Married (n = 109) | OR (95% CI)* | P value |
| Psychotic disorders               |                                       |                                      |             |         |                       |                   |             |         |
| Mood disorders                    |                                       |                                      |             |         |                       |                   |             |         |
| Bipolar disorder                  |                                       |                                      |             |         |                       |                   |             |         |
| Major depressive disorder         |                                       |                                      |             |         |                       |                   |             |         |
| Dysthymic disorder                |                                       |                                      |             |         |                       |                   |             |         |
| Nicotine use disorders            |                                       |                                      |             |         |                       |                   |             |         |
| Nicotine dependence              |                                       |                                      |             |         |                       |                   |             |         |
| Nicotine withdrawal               |                                       |                                      |             |         |                       |                   |             |         |
| Anxiety disorders                 |                                       |                                      |             |         |                       |                   |             |         |
| Generalized anxiety disorder      |                                       |                                      |             |         |                       |                   |             |         |
| Post-traumatic stress disorder    |                                       |                                      |             |         |                       |                   |             |         |
| Obsessive compulsive disorder     |                                       |                                      |             |         |                       |                   |             |         |
| Specific phobia                   |                                       |                                      |             |         |                       |                   |             |         |
| Social phobia                     |                                       |                                      |             |         |                       |                   |             |         |
| Agoraphobia                       |                                       |                                      |             |         |                       |                   |             |         |
| Panic disorder                    |                                       |                                      |             |         |                       |                   |             |         |
| Alcohol use disorders             |                                       |                                      |             |         |                       |                   |             |         |
| Alcohol abuse                     |                                       |                                      |             |         |                       |                   |             |         |
| Alcohol dependence                |                                       |                                      |             |         |                       |                   |             |         |

Values are presented as number (%).
OR = odds ratio, CI = confidence interval.
*The mean age of first marriage was 32.8 years for men and 30.1 years for women, according to the data from the 2016 population trend survey of Korea National Statistical Office; †After controlling for age, gender, number of years of education, employment status, area of residence, living arrangement, and household income.
the mean marriage age, individuals who have never been married were 2.6-fold more likely to have made suicide plans (aOR, 2.56; 95% CI, 1.19–5.51) and 3.5-fold more likely to have attempted suicide (aOR, 3.46; 95% CI, 1.61–7.46) after controlling for sociodemographic factors. The association of never-married status with suicide attempts (aOR, 3.21; 95% CI, 1.36–7.60) remained significant after controlling for sociodemographic factors and mental disorders. Approximately 17.4% of never-married people under the mean marriage age reported having experienced suicidal ideations, which was significantly higher than married people (9.9%). Among individuals who were under the mean marriage age, never-married status was not associated with suicidality after controlling for sociodemographic factors or for mental disorders and sociodemographic factors.

**Associations of age with mental disorders and suicidality in never-married people**

In never-married people, the above-the-mean-marriage-age group was not associated with an increased prevalence of mental disorders compared with the under-the-mean-marriage-age group. When scrutinizing the above-the-mean-marriage-age group, the younger-old group did not show increased OR for any mental disorders compared with the under-the-mean-marriage-age group. However, the older-old group was 6.3-fold more likely to have GAD (aOR, 6.32; 95% CI, 1.01–39.44) compared with the reference group controlling for sociodemographic factors.

**Table 5** demonstrates the prevalence and ORs of suicidality of those who have never been married and are above the mean marriage age compared with those who have never been married and are under the mean marriage age. People who have never been married and are above the mean marriage age are 1.5-fold more likely to have thought about suicide (aOR, 1.53; 95% CI, 1.11–2.11) and 2.7-fold more likely to have attempted suicide (aOR, 2.65; 95% CI, 1.36–5.17) compared with never-married people under the mean marriage age after adjusting for sociodemographic factors. The association of getting older than the mean marriage age with suicidal ideations (aOR, 3.48; 95% CI, 1.04–11.25) and suicide attempts (aOR, 2.53; 95% CI, 1.05–5.88) remained significant when controlling for mental disorders and sociodemographic factors. The prevalence and ORs for suicidality of those who are in the younger-old/older-old group within the above-the-mean-marriage-age group are also shown in **Table 5**. The younger-old group was 2.4-fold more likely to have thought of suicide (aOR, 2.42; 95% CI, 1.05–5.58) after adjusting for sociodemographic factors. The older-old group was 2.0-fold more likely to have thought of suicide (aOR, 2.01; 95% CI, 1.14–3.54) and 4.5-fold more likely to have attempted suicide (aOR, 4.53; 95% CI, 1.15–17.79) after adjusting for

| Table 4. Prevalence and ORs of suicidality in never-married people compared with married people |

| Suicidabilities | Above the mean age of first marriagea | Under the mean age of first marriagea |
|-----------------|--------------------------------------|-------------------------------------|
|                 | Model 1b                             | Model 2c |
|                 | Model 1b                             | Model 2c |
|                 | OR (95% CI) P value                  | OR (95% CI) P value |
|                 | OR (95% CI) P value                  | OR (95% CI) P value |
| Suicidal ideations |  |  |  |  |  |
| Never-married (n = 2,694) | 22.1 | 14.1 | 1.26 (0.86–1.84) | 0.239 | 1.07 (0.71–1.63) | 0.740 |
| Married (n = 2,694) | 17.4 | 9.9 | 1.32 (0.64–2.70) | 0.453 | 1.27 (0.58–2.77) | 0.531 |
| Suicide plans | 5.5 | 2.1 | 2.56 (1.19–5.51) | 0.016 | 2.20 (0.94–5.77) | 0.069 |
| Never-married (n = 602) | 5.6 | 2.1 | 2.76 (0.71–10.70) | 0.142 | 3.23 (0.57–18.41) | 0.186 |
| Married (n = 602) | 3.0 | 1.4 | 1.12 (0.19–6.43) | 0.900 | 1.46 (0.19–11.40) | 0.718 |
| Suicide attempts | 6.5 | 3.46 (1.61–7.46) | 0.002 | 3.21 (1.36–7.60) | 0.008 |
| Never-married (n = 109) | 3.0 | 1.4 | 1.12 (0.19–6.43) | 0.900 | 1.46 (0.19–11.40) | 0.718 |
| Married (n = 109) | 3.0 | 1.4 | 1.12 (0.19–6.43) | 0.900 | 1.46 (0.19–11.40) | 0.718 |

Values are presented as number (%).

OR = odds ratio, CI = confidence interval.

*aThe mean age of first marriage was 32.8 years for men and 30.1 years for women, according to the data from the 2016 population trend survey of Korea National Statistical Office; **After controlling for age, gender, number of years of education, employment status, area of residence, living arrangement, and household income; 3After controlling for age, gender, number of years of education, employment status, area of residence, living arrangement, household income, and mental disorders.

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sociodemographic factors. The older-old group was still significantly associated with suicidal ideations (aOR, 1.95; 95% CI, 1.02–3.71) when controlling for sociodemographic factors and mental disorders.

**DISCUSSION**

We investigated the different associations of marital status with mental disorders and suicidality above- and under-the-mean-marriage-age. In the above-the-mean-marriage-age group, the never-married people were more likely to have mental disorders (agoraphobia, OCD, mood disorders, and major depressive disorder) and suicidality (suicide attempts), which is congruous with previous findings. However, in the under-the-mean-marriage-age group, the never-married people were not more likely to have mental disorders and suicidality; on the contrary, they were less likely to have GAD, alcohol use disorders, and alcohol dependence. In addition, never-married people above the mean marriage age were more likely to have experienced suicidal ideations and have attempted suicide compared with those under the mean marriage age when controlling for sociodemographic factors and mental disorders. These findings suggest that never-married people are not homogeneous, and the impacts of never-married status on mental health are different depending on whether they are past the mean marriage age.

When considering only the above-the-mean-marriage-age group, the results were consistent with previous studies. In line with previous studies, this study showed an association between mood disorders, depression, and never-married status above the mean marriage age.22-25,37 The benefits of marriage on mental health may be mediated through diverse mechanisms, including social support,38 access to economic resources (financial security and the “marriage premium” by which married people demand higher salary),39 and the beneficial influence of spouses on marital partners’ health behaviors.40,41 In line with previous studies that have described that never-married status could increase the prevalence of anxiety disorders,42-46 we found a significant association between the never-married people and agoraphobia and OCD in this study. Nevertheless, we should be prudent when

**Table 5.** Prevalence and ORs of suicidality in never-married people above the mean marriage age compared with never-married people under the mean marriage age

| Suicidality          | Prevalence | OR (95% CI) | P value | OR (95% CI) | P value |
|----------------------|------------|-------------|---------|-------------|---------|
|                      | Comparison group | Reference group |         |             |         |         |
| 1. Never-married people above the mean marriage age (n = 260) vs. never-married people under the mean marriage age (n = 602) | 22.1 | 17.4 | 1.53 (1.11–2.11) | 0.009 | 1.49 (1.04–2.15) | 0.032 |
| Suicidal ideations   | 5.5        | 5.6         | 1.00 (0.55–1.81) | 0.992 | 0.74 (0.33–1.67) | 0.466 |
| Suicide plans        | 5.6        | 3.0         | 2.65 (1.36–5.17) | 0.004 | 3.38 (1.46–7.84) | 0.005 |
| Suicide attempts     | 2.05       | 17.4        | 2.42 (1.05–5.58) | 0.038 | 1.99 (0.79–5.04) | 0.147 |
| Suicide plans        | 6.1        | 5.6         | 0.44 (0.10–1.90) | 0.269 | 0.14 (0.02–1.24) | 0.078 |
| Suicide attempts     | 6.8        | 3.0         | 3.33 (0.60–18.69) | 0.171 | 5.05 (0.50–51.35) | 0.171 |

*The mean marriage age was 32.8 years for men and 30.1 years for women, according to the data from the 2016 population trend survey of Korea National Statistical Office; *After controlling for age, gender, number of years of education, employment status, area of residence, living arrangement, and household income; *After controlling for age, gender, number of years of education, employment status, area of residence, living arrangement, household income, and mental disorders; *We divided the above-the-mean-marriage-age group into two groups (younger old/older old) based on the median age (men = 40.0 years; women = 37.0 years) of the above-the-mean-marriage-age group in the sample.

**Values are presented as number (%).**

**OR = odds ratio, CI = confidence interval.**
interpreting results with large CI for agoraphobia. Because of a small number of respondents, there may be a lack of validity about the true effect. We need to assess more precisely the true association between never-married status and agoraphobia via larger sample size.

Never-married people under the mean marriage age did not exhibit significant results in most psychiatric disorders and exhibited lower ORs for GAD, alcohol use disorders, and alcohol dependence, which differed from the results of previous studies. These disagreements may have resulted from differences in participants and prevalence by countries; however, we could assume that never-married status does not have a significant effect on mental health in those who are under the mean marriage age. Young couples who have been married for a few years may experience significant economic pressures for some time, as they have been married with debt following their wedding (e.g., paying back home loans, installment payments for car, etc.). They are likely to experience various kinds of stresses during the birth and upbringing of children, which usually occurs in the early years of marriage. In this respect, the process of marriage itself can be a greater source of stress to people under the mean marriage age.

Never-married status is generally considered a risk factor for suicidality, and, as predicted, never-married people above the mean marriage age exhibited an increased risk of possessing suicide attempts than married people in this study. Never-married people may be vulnerable due to a lack of the protective factors that married people usually possess, such as social and moral support, responsibilities toward the family, and an outlet for relieving stress. However, this study did not show significant outcomes between never-married status and suicidality under the mean marriage age. Moreover, when we considered only the never-married people, getting older than the mean marriage age was associated with a higher ORs of suicide ideations and suicide attempts controlling for age. Thus, these findings suggest that getting older than the mean marriage age is independently associated with suicide, and its meaning is clearly different from the previous findings that age itself is a risk factor for suicide.

Never-married people above the mean marriage age are considered damaged, immature, insecure, self-centered, or unattractive. These negative stereotypes and labeling can have an effect on their psychological conditions. Feeling deficient and inadequate for being alone for extended periods, never-married people above the mean marriage age often lose self-esteem and self-worth owing to internalizing responsibility for not being married and not belonging to a “normal” group. Moreover, they are vulnerable to self-blame because they get older in a culture that is primarily dominated by married people, and therefore, the ever-present isolation, emptiness, loneliness, and despair sets in and becomes a constant companion. Consequently, they find it easy to have thoughts of death from these feelings of shame and loneliness. In this regard, a high association of suicidality may have been observed among those above the mean marriage age.

The negative impact of an individual’s unmarried status on their mental health was more profound in the older-old group than in the younger-old group. In this study, unmarried status in the older-old group was significantly associated with GAD, which was consistent with previous findings. Being an old never-married person could be considered “abnormal” or “different,” which can cause anxiety. Moreover, getting older alone without a spouse or any children is a concern for older never-married people that no one will take care of them when they become sick or are dying. As such, they are likely to be more vulnerable to anxiety.
In terms of suicidality, suicide ideations were significant in both younger- and older-old groups, but suicide attempts were significant only in the older-old group. Suicide attempts are the more serious form of suicidality than suicidal ideations. In this respect, the older-old group can be considered to be suffering greater psychological distress. In addition, the association between the older-old group and suicidal ideation was significant even after controlling for mental disorders, which means that relatively healthy people without mental disorders think more about suicide. Therefore, further investigation should be conducted to determine the cause of suicidal ideations in never-married people without mental disorders.

The results in this study indicate that clinicians should closely examine the suicidal thoughts and behaviors in never-married people above the mean marriage age, especially the older ones among them. Further, policymakers should strengthen support measures to improve the mental health of never-married people above the mean marriage age and develop strategies to reduce the suicide risks of those who are vulnerable.

However, there are several limitations to consider. First, as this study was based on a cross-sectional design, the causality between marital status and mental health could not be investigated. We interpreted the results to mean that having never been married increased prevalence of mental disorders, but people with poor mental health may not have been selected as partners due to the selective effects of marriage. Furthermore, we need to explore the impacts of marital status on mental disorder and suicidality through further longitudinal studies. Second, the judgment that their age is early or late for marriage and the impact of getting older than the mean marriage age alone could differ from person to person. Thus, we should be careful when generalizing the conclusions of this study. Third, this study was conducted in Korea, which is strongly influenced by Confucian culture that supports the notion that one must get married and continue a family lineage successively. However, values and attitudes toward marriage differ from country to country. Depending on the culture, exceeding the mean marriage age may not be a significant psychological burden. Nevertheless, this was the first study that analyzed the impact of getting older than the mean marriage age on mental disorders and suicidality. Moreover, the use of reliable methodology for psychiatric diagnoses in a large, nationwide representative sample enhances the validity of this study.

In conclusion, unlike those under the mean marriage age, never-married people above the mean marriage age were associated with mental disorders and suicidality. In particular, never-married people above the mean marriage age were more likely to have experienced suicidal ideations and have attempted suicide compared with those under the mean marriage age. This study demonstrates the need to address the risks of mental health and suicidality of never-married people above the mean marriage age and could be used as a basic resource for public mental health policy. Furthermore, it suggests the need for a national strategy to develop an environment where never-married people do not suffer even if their marriage is delayed.

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REFERENCES

1. Korean Statistical Information Service. Population trend study: the mean age of first marriage. http://kosis.kr/statHtml/statHtml.do?orgId=101&tbldId=INH_1B83A09&ew_cd=MT_GTITLE01&list_id=101&sesNo=&lang_mode=kor&obj_var_id=&conn_path=MT_GTITLE01. Updated 2019. Accessed December 12, 2019.

2. Kisker EE, Goldman N. Perils of single life and benefits of marriage. Soc Biol 1987;34(3-4):135-52. PUBMED | CROSSREF

3. Nilsson PM, Nilsson JÅ, Östergren PO, Berglund G. Social mobility, marital status, and mortality risk in an adult life course perspective: the Malmö preventive project. Scand J Public Health 2005;33(6):412-23. PUBMED | CROSSREF

4. Ross CE, Mirowsky J, Goldsteen K. The impact of the family on health: the decade in review. J Marriage Fam 1990;52(4):1059-78. CROSSREF

5. Cutright P, Fernquist R. Marital status integration, psychological well-being, and suicide acceptability as predictors of marital status differentials in suicide rates. Soc Sci Res 2005;34(3):570-90. CROSSREF

6. Gove WR. Sex, marital status, and mortality. AJS 1973;79(1):45-67. PUBMED | CROSSREF

7. Rogers RG. Marriage, sex, and mortality. J Marriage Fam 1995;57(2):515-26. CROSSREF

8. Gove WR. Sex, marital status and suicide. J Health Soc Behav 1972;13(2):204-13. PUBMED | CROSSREF

9. Kposowa AJ. Marital status and suicide in the national longitudinal mortality study. J Epidemiol Community Health 2000;54(4):254-61. PUBMED | CROSSREF

10. Qin P, Agerbo E, Mortensen PB. Suicide risk in relation to socioeconomic, demographic, psychiatric, and familial factors: a national register-based study of all suicides in Denmark, 1981–1997. Am J Psychiatry 2003;160(4):765-72. PUBMED | CROSSREF

11. Qin P, Agerbo E, Westergård-Nielsen N, Eriksson T, Mortensen PB. Gender differences in risk factors for suicide in Denmark. Br J Psychiatry 2000;177(6):546-50. PUBMED | CROSSREF

12. Organisation for Economic Co-operation and Development. Health at a glance 2019: OECD indicators. https://www.oecd-ilibrary.org/social-issues-migration-health/health-at-a-glance-2019_4dd50c09-en. Updated 2019. Accessed December 12, 2019.

13. National Center for Mental Health. Comprehensive plan of mental health. http://www.ncmh.go.kr/ kor/notice/snmhNoticeView.jsp?no=8062&fno=37&gubun_no=0&pgp=16&search_item=0&search_content=&menu_cd=K_02_01_00_00_00. Updated 2016. Accessed December 12, 2019.

14. Umberson D, Wortman CB, Kessler RC. Widowhood and depression: explaining long-term gender differences in vulnerability. J Health Soc Behav 1992;33(1):10-24. PUBMED | CROSSREF

15. Waldron I, Hughes ME, Brooks TL. Marriage protection and marriage selection--prospective evidence for reciprocal effects of marital status and health. Soc Sci Med 1996;43(1):113-23. PUBMED | CROSSREF

16. Yoo HJ, Hyun SM. The effects of economic resources on marriage-delaying. Korea J Popul Stud 2010;33(1):75-101.

17. Cargan L, Melko K. Singles: Myths and Realities. London: SAGE; 1982.

18. Lewis KG. Single Heterosexual Women through the Life Cycle. New York, NY: Guilford; 1994.

19. DePaulo BM, Morris WL. The unrecognized stereotyping and discrimination against singles. Curr Dir Psychol Sci 2006;15(5):251-4. CROSSREF

20. Cain M. The Childless Revolution. New York, NY: Diversion Books; 2013.

21. Himawan KK, Bambling M, Edirippulige S. What does it mean to be single in Indonesia? Religiosity, social stigma, and marital status among never-married Indonesian adults. Sage Open 2018;8(3):1-9. CROSSREF
22. Afifi TO, Cox BJ, Enns MW. Mental health profiles among married, never-married, and separated/divorced mothers in a nationally representative sample. *Soc Psychiatry Psychiatr Epidemiol* 2006;41(2):122-9.

23. Holt-Lunstad J, Birmingham W, Jones BQ. Is there something unique about marriage? The relative impact of marital status, relationship quality, and network social support on ambulatory blood pressure and mental health. *Ann Behav Med* 2008;35(2):239-44.

24. Inaba A, Thoits PA, Ueno K, Gove WR, Evenson RJ, Sloan M. Depression in the United States and Japan: gender, marital status, and SES patterns. *Soc Sci Med* 2005;61(11):2280-92.

25. Palner J, Mittelmark MB. Differences between married and unmarried men and women in the relationship between perceived physical health and perceived mental health. *Nor Epidemiol* 2002;12(1):55-61.

26. Grant BF, Goldstein RB, Chou SP, Huang B, Stinson FS, Dawson DA, et al. Sociodemographic and psychopathologic predictors of first incidence of DSM-IV substance use, mood and anxiety disorders: results from the wave 2 national epidemiologic survey on alcohol and related conditions. *Mol Psychiatry* 2009;14(11):1051-66.

27. Chang S, Abdin E, Shafie S, Sambasivam R, Vaingankar JA, Ma S, et al. Prevalence and correlates of generalized anxiety disorder in Singapore: results from the second Singapore mental health study. *J Anxiety Disord* 2019;66:102106.

28. Ansseau M, Fischler B, Dierick M, Albert A, Leyman S, Mignon A. Socioeconomic correlates of generalized anxiety disorder and major depression in primary care: the GADIS II study (generalized anxiety and depression impact survey II). *Depress Anxiety* 2008;25(6):506-13.

29. Liu HL, Wang HC, Yang MJ. Factors associated with an unusual increase in the elderly suicide rate in Taiwan. *Int J Geriatr Psychiatry* 2006;21(12):1219-21.

30. Johnson NJ, Backlund E, Sorlie PD, Loveless CA. Marital status and mortality: the national longitudinal mortality study. *Ann Epidemiol* 2000;10(4):224-38.

31. Kim JW, Jung HY, Won DY, Noh JH, Shin YS, Kang TI. Suicide trends according to age, gender, and marital status in South Korea. *Omega (Westport)* 2019;79(1):90-105.

32. Park SK, Lee CK, Kim H. Suicide mortality and marital status for specific ages, genders, and education levels in South Korea: using a virtually individualized dataset from national aggregate data. *J Affect Disord* 2018;237:87-93.

33. Cho MJ, Hahn BJ, Suh DW, Hong JP, Bae IN, Kim JK, et al. Development of a Korean version of the composite international diagnostic interview (K-CIDI). *J Korean Neuropsychiatr Assoc* 2002;41(1):123-37.

34. World Health Organization. *CIDI, Core Version 2.1 Interviewer's Manual.* Geneva: World Health Organization; 1997.

35. American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders.* 4th ed. Washington, D.C.: American Psychiatric Press; 1994.

36. Bertolote JM, Fleischmann A, De Leo D, Bolhari J, Botega N, De Silva D, et al. Suicide attempts, plans, and ideation in culturally diverse sites: the WHO SUPRE-MISS community survey. *Psychol Med* 2005;35(10):1457-65.

37. Williams K. The transition to widowhood and the social regulation of health: consequences for health and health risk behavior. *J Gerontol B Psychol Sci Soc Sci* 2004;59(6):S343-9.

38. House JS, Landis KR, Umberson D. Social relationships and health. *Science* 1988;241(4865):540-5.

39. Waite LJ. Does marriage matter? *Demography* 1995;32(4):483-507.

40. Eng PM, Kawachi I, Fitzmaurice G, Rimm EB. Effects of marital transitions on changes in dietary and other health behaviours in US male health professionals. *J Epidemiol Community Health* 2005;59(1):56-62.
41. Lee S, Cho E, Grodstein F, Kawachi I, Hu FB, Colditz GA. Effects of marital transitions on changes in dietary and other health behaviours in US women. *Int J Epidemiol* 2005;34(1):69-78.

42. Labrador FJ, Estupiñá FJ, Bermaldo-de-Quirós M, Fernández-Arias I, Alonso P, Ballesteros F, et al. Treatment of anxiety disorders in a psychology clinic. *Span J Psychol* 2015;18:E83.

43. Meng X, D'Arcy C. Common and unique risk factors and comorbidity for 12-month mood and anxiety disorders among Canadians. *Can J Psychiatry* 2012;57(8):479-87.

44. Lindeman S, Hämäläinen I, Isometsä E, Kaprio J, Poikolainen K, Heikkinen M, et al. The 12-month prevalence and risk factors for major depressive episode in Finland: representative sample of 5993 adults. *Acta Psychiatr Scand* 2000;102(3):178-84.

45. Williams DR, Herman A, Stein DJ, Heeringa SG, Jackson PB, Moomal H, et al. Twelve-month mental disorders in South Africa: prevalence, service use and demographic correlates in the population-based South African stress and health study. *Psychol Med* 2008;38(2):211-20.

46. Subramaniam M, Abdin E, Vaingankar JA, Chong SA. Obsessive–compulsive disorder: prevalence, correlates, help-seeking and quality of life in a multiracial Asian population. *Soc Psychiatry Psychiatr Epidemiol* 2012;47(12):2035-43.

47. Kendler KS, Lönn SL, Salvatore J, Sundquist J, Sundquist K. Effect of marriage on risk for onset of alcohol use disorder: a longitudinal and co-relative analysis in a Swedish national sample. *Am J Psychiatry* 2016;173(9):911-8.

48. Grant BF, Goldstein RB, Saha TD, Chou SP, Jung J, Zhang H, et al. Epidemiology of DSM-5 alcohol use disorder: results from the national epidemiologic survey on alcohol and related conditions III. *JAMA Psychiatry* 2015;72(8):757-66.

49. Amin-Esmaeili M, Rahimi-Movaghar A, Sharifi V, Hajebi A, Mojtabaee R, Radgoodarzi R, et al. Alcohol use disorders in Iran: prevalence, symptoms, correlates, and comorbidity. *Drug Alcohol Depend* 2017;176:48-54.

50. Lee HK, Chou SP, Cho MJ, Park JI, Dawson DA, Grant BF. The prevalence and correlates of alcohol use disorders in the United States and Korea--a cross-national comparative study. *Alcohol* 2010;44(4):297-306.

51. Um DW, Hong KZ. The impact of housing-cost burden on transition to marriage. *Social Welfare Policy* 2019;46(3):33-61.

52. Yoo GS. Effects of consumption wants and expected wedding expenses on expected marriage age among undergraduate students. *Health Soc Welf Rev* 2014;34(2):367-92.

53. Yi S, Lee S. A cause analysis of low fertility and population aging in Korea: evidence from economic factors in marriage determination. *Econ Anal* 2011;17(3):31-66.

54. Jun CA, Park SY. The effect of parenting stress and social support on marital satisfaction. *J Korean Home Econ Assoc* 1996;34(5):115-30.

55. Keum JH, Kim DS. The casual relationship among the father’s participation in childcare, job satisfaction, parenting stress, and marital satisfaction of working mother. *Fam Environ Rev* 2014;52(2):141-50.

56. Seo YE. Factors influencing to suicidal ideation by age group in Korean adults [master's thesis]. Seoul: Yonsei University; 2013.

57. Shin SJ, Cho YT. Social capital and suicidal impulse. *J Korean Soc Health Educ Promot* 2007;24(3):35-49.

58. Kim SY, Jung MI, Kim KN. Factors associated with suicidal ideation by age group among Korean adults: using the fifth Korea National Health and Nutrition Examination Survey (KNHANES V, 2012). *J Korean Soc Health Educ Promot* 2014;31(2):144.

59. Jung ES, Shim MS. Factors influencing suicidal ideation by age group in adults. *J Korean Public Health Nurs* 2016;30(2):326-36.

60. Eum C. *A Phenomenological Study of Never Married Women over 40*. Santa Barbara: Pacifica Graduate Institute; 2005.
61. Gruetzmacher A. The lived experience of being single for the never-married woman over age thirty [master’s thesis]. Tucson: The University of Arizona; 2001.

62. Beesdo K, Pine DS, Lieb R, Wittchen HU. Incidence and risk patterns of anxiety and depressive disorders and categorization of generalized anxiety disorder. *Arch Gen Psychiatry* 2010;67(1):47-57. PUBMED | CROSSREF

63. Lim L, Ng TP, Chua HC, Chiam PC, Won V, Lee T, et al. Generalised anxiety disorder in Singapore: prevalence, co-morbidity and risk factors in a multi-ethnic population. *Soc Psychiatry Psychiatr Epidemiol* 2005;40(12):972-9. PUBMED | CROSSREF

64. Muhsen K, Lipsitz J, Garty-Sandalon N, Gross R, Green MS. Correlates of generalized anxiety disorder: independent of co-morbidity with depression: findings from the first Israeli national health interview survey (2003–2004). *Soc Psychiatry Psychiatr Epidemiol* 2008;43(11):898-904. PUBMED | CROSSREF

65. Lewis KG, Moon S. Always single and single again women: a qualitative study. *J Marital Fam Ther* 1997;23(2):115-34. PUBMED | CROSSREF