



Research report

Suicidal ideation among postmenopausal women on hormone replacement therapy: The Korean National Health and Nutrition Examination Survey (KNHANES V) from 2010 to 2012



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ABSTRACT

Background: Suicide is a major public health problem around the world. Some studies have found that hormone replacement therapy (HRT) is associated with depression in postmenopausal women. Depression is a well-known risk factor for suicide; therefore, we investigated the relationship between HRT and suicidal ideation in postmenopausal Korean women.

Methods: We included 2286 postmenopausal women with or without HRT from the Korean National Health and Nutrition Examination Survey 2010–2012. The use and duration of HRT and mental health status, including stress, depressive mood, and suicidal ideation and attempts, were assessed by self-report questionnaires.

Results: The proportion of participants with depressive mood and suicidal ideation was higher in the HRT group than the non-HRT group (all p values < 0.05). As the duration of HRT increased, the percentage of participants with suicidal ideation increased (p for trend = 0.006). After adjusting for all covariates, the odds ratio (95% confidence intervals) for suicidal ideation was 1.742 (1.223–2.482) in the women with HRT, compared to women without HRT. HRT duration longer than 10 years was associated with suicidal ideation (odds ratio = 2.089 and 95% confidence intervals = 1.069–4.084).

Limitations: The cross-sectional design, a possibility of incorrect answer about menopausal status, and no assessment of the type of HRT are the main limitations of this study.

Conclusion: Postmenopausal women receiving HRT, especially for more than 10 years, showed increased suicidal ideation compared with postmenopausal women without HRT. Physicians should pay attention to mood symptoms and suicidal ideation in postmenopausal women with HRT.

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1. Introduction

Suicide is a major public health problem in South Korea and several other countries (Ustun et al., 2004). The suicide rate is high in Eastern European and Asian countries, especially in South Korea, and low in Latin America (Mann et al., 2005; Park et al., 2014). According to the 2012 data of World Health Organization, the highest age-standardized suicide rate (per 100,000) was 44.2 in Guyana and the lowest age-standardized suicide rate was 0.4 in Saudi Arabia (WHO, 2015). Compared to the age-standardized suicide rate of United States (12.1) and Brazil (5.8), the suicide rate was high in South Korea (28.9) and Lithuania (28.2) (WHO, 2015).

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The suicide rates have been decreasing in some countries such as Hungary and Estonia, however, the suicide rates have been increasing in Japan and South Korea (OECD, 2013). Especially, the suicide rate of South Korea increased two-fold from 2001 to 2010 (Office KNS, e., 2012). The mortality rate from suicide has rapidly increased in South Korea. The mortality rate from suicide increased from 22.6% in 2003 to 28.5% in 2013, making suicide the fourth leading cause of death in South Korea (Office KNS, e., 2014). The risk of suicide increases with increasing age (O'Connell et al., 2004; Spicer and Miller, 2000) and depression (Nock et al., 2008; Randall et al., 2014; Ro et al., 2015). Suicide attempts are four times more common in women than in men (Kaplan et al., 1994), and postmenopausal women in particular are known to have more suicidal ideation compared to premenopausal women (Kornstein et al., 2010).

Hormone replacement therapy (HRT) is indicated for management of menopausal symptoms (Doren, 2000; Soares et al., 2001).

Perimenopausal and postmenopausal women can suffer from hot flashes, sweating, and several mood disorders such as new-onset depression (Avis et al., 1994; Bromberger et al., 2003, 2001). At the times of hormonal fluctuations, women are especially susceptible to developing depression (Bromberger et al., 2010), and among the reproductive phases of women, the perimenopausal phase presents the highest risk for developing depression (Prior, 1998; Soares and Zitek, 2008a).

Some studies, including a Korean study, have found a relationship between HRT and depression (Hlatky et al., 2002; Jung et al., 2015; Lim et al., 2006; Rexrode and Manson, 2002; Soares et al., 2001; Studd and Panay, 2009; Whooley et al., 2000). However, there has been no study on the relationship between suicidal ideation and HRT in postmenopausal women in South Korea. Therefore, we evaluated this relationship using data representative of the Korean population.

2. Methods

2.1. Survey overview

We used data from the fifth Korean National Health and Nutrition Examination Survey (KNHANES V, 2010–2012), a survey that has been periodically conducted to assess the health and nutritional status of the non-institutionalized Korean population. The KNHANES has been conducted since 1998 by the Division of Chronic Disease Surveillance at the Korean Center for Disease Control and Prevention as a nationwide survey. For the KNHANES V, trained investigators performed face-to-face interviews. The assessment consisted of a physical examination, nutritional survey, and health interview, and was performed as a one-time commitment for each woman. Each element of the assessment was conducted by the same investigators (Park, 2013). The subjects in the KNHANES were selected from the 2005 National Census Registry using a cluster sampling design, stratified into multiple stages, and prorated by age. Sample weights were created to represent the Korean population among the sample participants, with consideration for complex survey design, non-response, and post-stratification.

2.2. Subjects

A total of 13,918 women aged ≥ 19 years were included in the KNHANES. We only included postmenopausal women and excluded those who had a history of hysterectomy and those who did not answer the questions. Finally, 2286 postmenopausal women were included in this study. The study protocol was approved by the institutional review board of Korean Center for Disease Control and Prevention (2010-02CON-21-C, 2011-02CON-06-C, and 2012-01EXP-01-2C), and the study was conducted according to the Ethical Principles for Medical Research Involving Human Subjects, as defined by the Helsinki Declaration. Written informed consents were obtained from all subjects.

2.3. Anthropometric measurements

A trained examiner measured height (cm), waist circumference (cm), and weight (kg) to the nearest 0.1 cm, 0.1 cm, and 0.1 kg, respectively, of participants wearing light clothes without shoes. After expiration, waist circumference was measured on a horizontal plane at the midpoint level between the costal margin and iliac crest. Body mass index (BMI) was obtained by dividing weight (kg) by the square of height (m^2).

2.4. Menopause and HRT

The term “menopause” was defined as a point in time 1 year after the cessation of menstruation. The presence and duration of menopause and the use and duration of HRT were assessed by self-report questionnaires.

2.5. Depression and chronic diseases

The participants were asked whether they had been previously diagnosed with depression using a self-report questionnaire. Those who had ever been diagnosed with depression by a doctor were classified as having depression. Several chronic diseases, such as hypertension (HTN), diabetes mellitus (DM), and hypercholesterolemia, were also surveyed by self-report questionnaire as some chronic diseases are independently associated with suicide (Juurlink et al., 2004).

2.6. Other mental health measures

Mental health surveys were provided to all participants. Mental health measures assessed the domains of stress, depressive mood, and suicidal ideation and attempts. Participants reported their level of stress as none, mild, moderate, or severe. If participants answered “yes” to moderate or severe stress, they were classified into the stress group. To assess depressive mood, participants answered “yes” or “no” to a question of whether they had experienced a depressed mood for 2 or more continuous weeks during the last year. To assess suicidal ideation and attempts, participants answered “yes” or “no” to the question “In the last 12 months, did you think about committing or attempting suicide?”.

2.7. Sociodemographic and general health behaviors

Sociodemographic variables were assessed by a self-administered questionnaire asking about age, place of residence (urban), spouse, occupation, family income, and education level. Household income was divided into quartiles and was adjusted for the number of family members. Education level was categorized as either high school graduate or not (≥ 10 years). General health behaviors were also assessed by the questionnaire. Smokers were defined as those who had ever smoked at least 100 cigarettes in their entire life. Alcohol drinkers were those who drank alcohol. Physical activity was defined using the International Physical Activity Questionnaire (Hagströmer et al., 2006). Regular exercisers were those who exercised more than 3 times a week at an intense level for more than 20 min/session or those who exercised more than 30 min/session.

2.8. Statistical analysis

Data were presented as either mean \pm standard error (SE) for continuous variables or as percentage (SE) for categorical variables. Chi-square and *t* tests were used to analyze the general characteristics of the subjects. A Chi square test was used in the analysis of the relationship between suicidal ideation and HRT and between depression and suicidal ideation in the HRT group. The *t* test was used in the analysis of the relationship between HRT and mental status. For sensitivity analysis, three multivariate logistic regression models were used to examine the odds ratios (ORs) and 95% confidence intervals (CI) of the suicidal ideation according to the status and the duration of HRT. We selected some covariates based on the suicide risk (age, BMI, general health behaviors such as alcohol, smoking, and physical activity, and socioeconomic variables), and we also adjusted chronic diseases because several studies have found a relationship between suicide and chronic

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