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Breakfast consumption and depressive mood: A focus on socioeconomic status

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ABSTRACT

Skipping breakfast can be potentially harmful because breakfast consumption is considered one of the important health-related behaviors that benefit physical and mental health. As the rate of depression has increased recently, we investigated the association between the frequency of eating breakfast and depression in adults. We obtained the data from the 2013 Korean Community Health Survey; a total of 207,710 survey participants aged 20 years or over were studied. Participants were categorized into three groups by the frequency of breakfast consumption as follows: "seldom," "sometimes," and "always." We performed a multiple logistic regression to investigate the association between breakfast consumption and depressive mood. Subgroup analyses were conducted by stratifying socioeconomic variables controlling for variables known to be associated with depressive symptoms. Participants who had breakfast seldom or sometimes had higher depressive symptoms than those who always ate breakfast ("seldom": OR = 1.43, 95% CI 1.36–1.52; "sometimes": OR = 1.32, 95% CI 1.23–1.40). Subgroup analyses showed that this association was more marked in those who were 80 years or older, those who had low household income, or those with elementary school education level or less. The result of this study suggests that lack of breakfast consumption is associated with depression among adults with different socioeconomic factors.

1. Introduction

Skipping breakfast is a rising trend attributable to social change and reduced breakfast portions (Kim, 2015). According to the Korean National Health and Nutrition Examination Survey (KNHANES), the rate of skipping breakfast rose from 21.4% in 2011 to 23.9% in 2013 (Korea Centers for Disease Control Prevention, 2014). This rate is similar to that of the United States; the 2002 National Health and Nutrition Examination Survey (NHANES) found that skipping breakfast is common among American adults (18%) (Kant & Graubard, 2006). Further, according to the 1999–2006 NHANES (Deshmukh-Taskar et al., 2010), 31.5% of adolescents did not consume breakfast daily. This trend is somewhat alarming because breakfast consumption is considered to be a health-promotion behavior (Pearson, Biddle, & Gorely, 2009).

Breakfast consumption has various health benefits such as lowering obesity rates and cardio-metabolic risk (Huang, Hu, Fan, Liao, & Tsai, 2010). Moreover, it is known to be positively linked to a healthy immune system (Li et al., 2007) by lowering cortisol level (Smith, 2002) because a high level of cortisol suppresses the function of T cells or Natural killer cells (Segerstrom & Miller, 2004). Apart from these somatic health benefits, breakfast consumption is also known to have psychological effects such as anxiety reduction (Maridakis, Herring, & O'Connor, 2009), alleviating insomnia (Kaneita et al., 2006), and a better quality of life (Huang et al., 2010). Therefore, one may expect that breakfast consumption is associated with mental health, especially depression which becomes the great part of burden of disease.

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According to the Epidemiology Survey of Mental Disorders in Korea, the lifetime and one-year prevalence of depression in 2011 was 6.7% and 3.0%, respectively. This is nearly 20% higher than the prevalence in 2006 (Cho, Park, Bae, & Bae, 2011). The World Health Organization (WHO) reported that depression will be the second largest contributor to global disease burden by 2020 (World Health Organization, 2002). Given that depression affects psychological and somatic functioning, and moreover, its high morbidity and mortality rates and the increasing risk of suicide are detrimental to the society (Chapman & Perry, 2008), global efforts to prevent depression are necessary (Mammen & Faulkner, 2013).

As breakfast consumption is known to be associated with reduced cortisol production (Smith, 2002), which is related to moods, and has been linked to prevention of suicide among children (Wong & Chiu, 2015), it is important to investigate the association between breakfast consumption and depression. However, very few studies have investigated the association between breakfast consumption and depression or mental health. Most of these studies have focused on a specific age group like children, adolescents, or seniors (Gollub & Weddle, 2004; Lesani, Mohammadpoorasl, Javadi, Esfeh, & Fakhari, 2016; O'Sullivan et al., 2009). Additionally, considering that socioeconomically disadvantaged group tends to have a higher breakfast skipping rate (Siega-Riz, Popkin, & Carson, 2000), the association between breakfast and mental health by socioeconomic status must be investigated.

Therefore, this study attempts to examine (1) the association between the frequency of breakfast consumption and depression among adults aged 20 years or above, and (2) the association between the frequency of breakfast consumption and depression by socioeconomic factors including age, gender, educational level, household income, and occupation.

2. Methods

2.1. Data

The Community Health Survey (CHS) has been conducted by the Korean Centers for Disease Control and Prevention (KCDC) since 2008 to establish and evaluate regional health plans and produce comparable regional health statistics by standardizing the survey system (Kang et al., 2015). We used the 2013 CHS data, collected from 228,781 people aged 20 years or older. We excluded individuals with missing data for variables used in this study; therefore, a final population of 207,710 people was selected for this study (Fig. 1). This data was approved by the Institutional Review Board (IRB: 2012-07CON-01-2C)

2.2. Study variables

The dependent variable of this study was depressive symptoms, measured by the CHS question on the experience of depressive symptoms: “Have you experienced sorrowful or despairing emotions affecting your daily life more than two weeks over the past year?” Individuals who answered “yes” to the question were classified into the “depressive symptom group,” and others were classified into the “non-symptom group.” We excluded participants who gave “no response” and “don't know” responses.

The key independent variable of this study was the frequency of eating breakfast. Responses to the following CHS question determined the frequency of breakfast consumption: “On how many days did you have breakfast in the previous week?” We classified the answers into three categories: 0–2 days a week as “seldom,” 3–5 days a week as “sometimes,” and 6–7 days a week as “always.”

We used sociodemographic, economic, and health factors as control variables. Sociodemographic variables comprised age (seven groups in 10-year intervals), gender, marital status (three groups: unmarried, married-cohabiting, married-not cohabiting, i.e., divorced, widowed, and separated), educational level (elementary school or lower, middle school, high school, and university or higher), living arrangement (living alone or living with others such as family, relatives, family, etc.), and participation in social activities including religious, community, leisure, and volunteering activities (two groups: no social activity group, and at least one social activity). The economic variables were household income (based on 1st through 4th quartile) and occupation (four groups based on International Standard Classification Occupations codes: white collar, codes 1–3; pink collar, codes 4–5; blue collar, codes 6–9; and others including student, housewife, soldier, or being unemployed). Health variables included smoking, alcohol consumption, sleeping duration, obesity based on the Body Mass Index (BMI; calculated using self-reported body weight and height), physical activity (three groups based on the International Physical Activity Questionnaire-short form: non-active, active, and health-enhancing physical activity—HEPA) (IPAQ Research Committee, 2005), and perceived stress level. The perceived stress level was measured by the CHS question “How do you usually feel stressed in your daily life?” Responses ranged along four-scale (extremely, highly, less, or little) (Yun et al., 2015). We classified “extremely” and “highly” to “high” group, “less” to “less” group, and “little” to “little” group.

2.3. Statistical analyses

Statistical analyses were performed using SAS (version 9.4). Pearson's Chi-squared test was used to test statistical differences in the distribution of each variable. Subsequently, multiple logistic regression analysis was performed to examine the association between breakfast consumption and depressive symptoms, controlling for covariates (gender, age, marital status, educational level, living arrangement, social activity, household income, occupation, smoking, alcohol consumption, perceived stress level, obesity, sleep duration, and physical activity). A set of subgroup analyses were performed by age, gender, educational level, household income, and occupation to test any independent association between breakfast consumption and depressive symptoms after controlling for covariates. We presented adjusted odds ratios (ORs) with 95% confidence intervals (CIs).

3. Results

The general characteristics of the 207,710 survey participants in this study are listed in Table 1. Of the total participants, 16.1% (n = 33.450) reported that they seldom had breakfast, 10.3% (n = 21,344) reported having breakfast sometimes, and 73.6% (n = 152,916) reported having breakfast always. Of the total participants, 5.7% (n = 11,832) reported experiencing depressive symptoms for more than two weeks in the previous year.

The results of the multiple logistic regression model analyzing the factors associated with depressive symptoms are included in Table 2. Concerning the frequency of breakfast which is our main interesting variable, those who had breakfast seldom (OR: 1.43, 95% CI: 1.36–1.52) and sometimes (OR: 1.32, 95% CI: 1.23–1.40) were more likely to report having depressive symptoms than those who always had breakfast. Women were 1.60 times more likely than men to have depressive symptoms (OR: 1.60, 95% CI: 1.52–1.69). An inverted U-shape was observed for the relationship between age and depression. Regarding household income, the low (OR: 1.62, 95% CI: 1.51–1.74) and middle-low (OR: 1.28, 95% CI: 1.20–1.37) groups were more likely to have depressive symptoms than the