Association Vit-D Deficiency and Generalized Anxiety Disorder

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비타민-D 결핍과 불안장애의 연관성

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Abstract

This study aimed to examine the relationship between generalized anxiety disorder (GAD) and various demographic, lifestyle, clinical, and women's health factors in premenopausal adult women with vitamin D deficiency, using data from the 2021-2023 Korean National Health and Nutrition Examination Survey. A total of 3,299 women were included after applying exclusion criteria. Participants were categorized into Low and High GAD groups based on their GAD scores. The high anxiety group was younger and showed significantly higher levels of moderate physical activity, weight gain, BMI, perceived stress, and depressive symptoms. Differences were also observed in marital status, income level, and HbA1c, creatinine, and BUN levels. In terms of women's health, the high anxiety group had lower rates of pregnancy, childbirth, and breastfeeding, but a higher rate of oral contraceptive use. These findings highlight key factors associated with anxiety in women with low vitamin D levels and may support future prevention and intervention strategies.

1. Introduction

Vitamin D is a fat-soluble nutrient essential for calcium and phosphorus metabolism, immune function, and neuroprotection. It is primarily synthesized in the skin through sunlight exposure, but modern indoor lifestyles and sunscreen use often lead to deficiencies. Studies suggest a strong link between low vitamin D levels and mental health issues such as depression and anxiety. Vitamin D affects neurotransmitter synthesis (e.g., dopamine, serotonin) through receptors found in brain regions like the hippocampus and prefrontal cortex, which regulate mood and stress. Deficiency may impair these functions, contributing to emotional disorders. Additionally, vitamin D's anti-inflammatory properties help reduce brain inflammation, a factor in anxiety and depression.

2. Methods

2.1 Study design

This study used secondary data from the 2021-2023 Korean National Health and Nutrition Examination Survey. The analysis focused on premenopausal adult women who had begun menstruating. Participants missing Vitamin D data or with daily Vitamin D intake below were also excluded. The final sample included 3,299 women..

2.2 Statistical analysis

The variables used in the predictive model were those that showed significant differences between the GAD groups, which were used to derive a model predicting the level of GAD anxiety. The data analysis was conducted using IBM SPSS program ver. 25.0 (IBM Corp., Armonk, NY, USA), and the statistical significance level was set at 0.05.

3. Results

3.1 Demographic and Lifestyle Factors of the GAD Groups

The demographic and lifestyle characteristics of the Low and High GAD groups. The high anxiety group was younger on average (35 vs. 37 years, $p < .001$). No significant differences were found in alcohol use, smoking, high physical activity, employment, education, or residential area. However, significant differences were observed in moderate physical activity ($p = .005$), marital status ($p < .001$), income level ($p = .047$), perceived stress ($p < .001$), weight gain over the past year ($p < .001$), and BMI ($p = .044$). Weight control efforts and waist circumference did not differ significantly between groups.

3.2 GAD Group and Chronic Diseases, Mental Health, and Clinical Indicators

A metabolic diseases and clinical indicators by GAD group. No significant differences were found in diabetes, hypertension, dyslipidemia, blood pressure, pulse rate, glucose, cholesterol, liver enzymes (AST/ALT), or most kidney function markers. However, depressive symptoms were significantly more common in the high anxiety group (41.1% vs. 6.7%, $p < .001$). HbA1c was slightly lower in the high anxiety group ($p = .020$), while creatinine and BUN were significantly higher in the low anxiety group ($p = .023$, $p = .030$).

3.3 GAD Group and Women's Health Factors

A women's health factors by GAD group. No significant difference was found in age at menarche. The high anxiety group had lower rates of pregnancy ($p < .001$), childbirth ($p < .001$), and breastfeeding experience ($p = .045$). Women in the high anxiety group were also less likely to have had multiple pregnancies ($p = .002$) but more likely to use oral contraceptives ($p = .013$).

4. Discussion

The results of this study are significant as they provide a comprehensive analysis of various demographic, lifestyle, and clinical factors associated with Generalized Anxiety Disorder (GAD) in adult women of reproductive age who have vitamin D deficiency.

Reference

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