IS THERE AN ASSOCIATION BETWEEN VITAMIN D AND DEPRESSION SYMPTOMS

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Abstract

Introduction: Background: Depression is considered one of the most abundant and serious psychological problems around the world. Moreover, many researches in different countries mentioned the relationship between depression and vitamin D level in those people who suffering from symptoms of depression. Furthermore, there are many studies interested in using non-pharmacological techniques to help clients with depression symptoms. Therefore, this literature review will evaluate is there association between Vitamin D levels and depression symptoms.

Methods: The studies in this literature review were chosen by electronic searches on Pubmed, CINAHL, and MEDLINE, for the years between 2008 and 2013. The selection criteria were to select research from different countries which was characterized by different climates and economic statuses focusing on association between depression symptoms and vitamin D.

Conclusion: There are many researchers that have mentioned an association between depression and vitamin D. In contrast there are numbers of researchers who didn't find the association between vitamin D and depression symptoms. The author's point of view there is association between depressive symptoms and vitamin D and there are many factors that contribute to this association such as the economic and environmental characteristics for these countries that are included in this paper.

Key words: Vitamin D, depression, vitamin D and depression relationship.

Introduction

Depression as mentioned in the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) is mood dysregulation that is expressed by feelings of loss of interest, pleasure or depressed mood (DSM-5, 2013). Symptoms of depression are: weight loss, decrease or increase in appetite, insomnia or hypersomnia, Fatigue, restlessness, psychomotor agitation or retardation, worthlessness, Diminished ability to concentrate or think, suicidal ideation and a suicide attempt (DSM-5, 2013).

World Health Organization (WHO) in 2012 considered that, depression contributes significantly to the global burden of illness and affects all people around the world. About three hundred and fifty million people are affected by depression.

Depression can lead to suicide at its worst. About one million people lose their lives every year and more than twenty million people may attempt to finish his or her life (WHO, 2012). In the United States of America depression is one of the main reasons for disability (Ganji, Milone, M Cody, McCarty & Wang, 2010). Depression leads to loss of productivity and high medical bill costs (Noi-Okwei, 2010).

Total cost of depression in the United Kingdom is more than nine billion pound (O’Neill, 2008). After comparing depression with some chronic diseases in different parts of the world it is found that depression has the biggest impact on worsening health, and people who have chronic illness with depression had the worst health measures of all disease states (O’Neill, 2008). Depression leads to a direct impact on judgment, cognitive processes and decision making (Noi-Okwei, 2010).
Vitamin D (calciferol) comprises a group of seco-sterols. They are considered hormones because of their endocrine, paracrine, and autocrine activity (Utter, 2012). It was believed in the past that vitamin D is a vitamin fully, but in recent years it has been shown that it is also considered a hormone that can be activated by the body's exposure to sunlight (Ettinger & DeLuca, 1996). Vitamin D exists in a small number of foods, such as fatty fish, egg yolks, liver, fish-liver oils and mushrooms (Utter, 2012).

There are several types of vitamin D, vitamin D3 or cholecalciferol naturally produced in the skin by 7-dehydrocholesterol. Vitamin D2 or ergocalciferol a derived from plants; and is the preferred choice for vegetarians. Calcitriol is an active form of Vitamin D in the body, used in cases of End Stage Renal Disease (ESRD) for who are cannot convert vitamin D3 to calcitriol (Stone, 2013).

Vitamin D reduces the frequency of fractures and falls, reduces symptoms of influenza or colds, and helps to prevent cardiovascular disease. There are Benefits seen in depression, Crohn's disease, diabetes mellitus, pain, multiple sclerosis, and possibly autism (Kauffman, 2009).

The data show that depression increases in the winter time where vitamin D levels are low, and by discovery of vitamin D receptors (VDR) in the brain, this led to the set of theories about the relationship between vitamin D and depression (Kjaergaard et al., 2012). Vitamin D concentrations have been found to be low in patients with mood disorders and have been associated with cognitive function (Wilkins, Sheline, Roe, Birge, & Morris, 2006).

Actions of vitamin D in the brain are still not well understood. It may act to stimulate the nerve receptors in areas responsible for regulating behavior, such as cortex, cerebellum, and limbic system (Utter, 2012). In the study on distribution of the vitamin D receptor and 1a hydroxylase in human brain, it was found that the strongest receptor and enzyme was in the hypothalamus and in large neurons inside the substantia nigra (Eyles, Smith, Kinobe, Hewison, & McGrath, 2005).

There are many receptors for vitamin D in the brain, for this reason vitamin D has been linked with mental health problems and depression. Also Vitamin D plays an important role in brain development (Vitamin D Council, 2012). For patients who show the effectiveness of vitamin D as antidepressant, Vitamin D is one of the most cost-saving therapies and has less side effects in treatments in psychiatry (Young, 2009).

The aim of this study is to determine is there association between vitamin D and depression symptoms.

Literature Review

The aims of literature review are to examine the association between vitamin D and depression symptoms among depressed clients, and identify methods of application.

A survey study implemented in the United States of America in 2010, to assess the link between depression and vitamin D, was applied on 7970 people from different regions of the United States, with the sample of study between 19 - 39 years old. The result of study was, people with serum vitamin D were equal to or less than 50 nmol/L were significantly higher in having depression episodes than people with serum vitamin D equal to or more than 75 nmol/L. The conclusion of study was, depression is a higher rate between those with vitamin D deficiency when compared with people who have sufficient amount of vitamin D (Ganji, Milone, M Cody, McCarty, & Wang, 2010).

In a survey study in England to assess the relation between depression symptoms and vitamin D deficiency, data were analyzed from two thousand and seventy people who participated in the 2005 Health Survey for England. The finding is there is a relationship between late-life depression in northern latitudes and vitamin D deficiency (Stewart & Hirani, 2010).

A non clinical sample of young adults contain 630 University of Otago students, 236 men and 394 women were enrolled to assess the association between depression scores and vitamin D status. By using the Centre for Epidemiologic Studies Depression Scale (CES-D) on the first day, then taking notes by writing a diary on how the day was spent for participants for thirteen days, on the fourteenth day of the study a blood sample was taken from the participants for 25 (OH) D analyses. The findings were depression scores in this young adult sample were greatly negatively correlated with Vitamin D status (Polak, Houghton, & Conner, 2013).

A study was done in England in 2010 to evaluate if lower levels of vitamin D were associated with depression in men in the European Community. The sample contained three thousand and three hundred and sixty-nine European men between middle-age to older men. Serum vitamin D and parathyroid hormone was measured by radioimmunoassay, and The Beck Depression Inventory-II (BDI-II) was used to screen for depression. Using multivariable logistic regression there was no relationship between parathyroid hormone and depression. Depression increased about 70% through vitamin D deficiency. Findings show the existence of an inverse relationship between vitamin D and depression (Lee et al., 2010).

A large population-based cohort study in Amsterdam, the Netherlands, was carried out to identify if there was a relationship between depression and vitamin D and parathyroid hormone levels. It was a population-based
cohort study design with one thousand two hundred eighty-two community residents between sixty-five and ninety-five years. Levels of vitamin D and PTH was assessed and depression was measured by using Center for Epidemiologic Studies- Depression scale, and measured explanatory factors such as physical activity, level of urbanization, potentially confounding factors such as body mass index, age, sex, number of chronic conditions, and others. Severity of depression increased by decreased vitamin D levels and with increased PTH levels; therefore, there was a relation between depression and vitamin D and PTH levels (Hoogendijk et al., 2008).

A study was carried out to determine if there is a relation between depression and vitamin D among a general cardiovascular population. The sample consisted of seven thousand, three hundred and fifty-eight patients with cardiovascular diseases, no prior depression diagnosis, age greater or equal to fifty years, then they measured vitamin D and were classified to four categories: optimal, normal, low, and very low. Findings were that there was an association and that association increased by factors such as, in the winter appeared larger, by age greater or equal to sixty-five, diabetes, and male sex were enhanced greater or equal to sixty-five (May et al., 2010).

A randomized trial study was conducted in the United State between 1995 to 2000, about the relationship between depression and vitamin D. The study included 36,282 postmenopausal women between 50 and 79 years old. It was to assess the effectiveness of daily supplementation with 400 IU of vitamin D3 combined and 1000 mg of calcium on depression in a randomized sample. Two years later by using the Burnham scale, the randomized women who received vitamin D and calcium after comparing with placebo group, appear on the continuation of the symptoms of depression. The findings show there is no relationship between 400 IU of vitamin D3 and calcium daily and depression in old women. The study recommends to conduct new studies containing a larger dose of vitamin D to determine its effectiveness in helping to prevent or treat depression (Bertone-Johnson et al., 2012).

A study was conducted in 2012 using a randomized control trial, to compare depression symptoms in participants with high and low levels of serum 25-hydroxyvitamin D (25(OH)D) and determine whether supplementation of vitamin D3 would enhance symptoms of depression in those with low vitamin D levels. Participants with low vitamin D levels were divided into two groups, placebo or 40 000 IU vitamin D3 per week for 6 months. Participants with high levels of vitamin D were used as nested controls. Depression was measured by using Hospital Anxiety and Depression Scale, Beck Depression Inventory, and Seasonal Pattern Assessment Scale and Montgomery-Asberg Depression Rating Scale. Results show the presence of two hundred and thirty participants with low levels of vitamin D, compared with one hundred and fourteen participants with high levels of vitamin D, which indicated that the number of participants with low levels of vitamin D were more depressed than participants with high levels of vitamin D. Conclusion is there is relation between depression symptoms and vitamin D, but there are no effects for vitamin D supplementation to improve depression symptoms (Kjærgaard et al., 2012).

In a study from Beijing and Shanghai, China, to evaluate the relation between depression symptoms and vitamin D by using cross-sectional study., in 2005, about three thousand two hundred and sixty-two people between the ages of fifty and seventy years from community residents participated. Depression was measured by Center for Epidemiological Studies of Depression Scale (CES-D) and depression was defined on the scale as sixteen or more; vitamin D was measured by radioimmunoassay. The finding was vitamin D isn’t associated with depression symptoms among middle aged and elderly Chinese from either Beijing or Shanghai (Pan et al., 2009).

Conclusion

The author of this paper concludes that there are many numbers of research studies that supported the hypothesis of an association between vitamin D and depression symptoms in addition, to a number of other research studies that rejected this association.

In this research we found all of Ganji, Milone, M Cody, McCarty, and T Wang, 2010, Stewart and Hirani, 2010, Polak, Houghton, and Conner, 2013, May et al., 2010, Hoogendijk et al., 2008, and Lee et al., 2010 confirmed the existence of association between vitamin D and depression symptoms. In the other direction, Bertone-Johnson et al., 2012, Kjærgaard et al., 2012, and Pan et al., 2009, clarified the absence of association between depression and vitamin D. Most of the researchers in this research presented an association between vitamin D and depression and the possibility of the use of vitamin D in the treatment plan for depression symptoms.

Point of View

The author expected that there are associations between vitamin D and depression symptoms, due to the existence of a relationship in most of the research that examined the relationship of vitamin D with depression, in addition to the possibility of linking between seasonal depression and lack of exposure to sunlight with the phenomenon of vitamin D deficiency.

It can also take advantage of vitamin D in depression because it is characterized by the lack of side effects, and inexpensive in addition, to the possibility of using vitamin D without shame or stigma from social or others.
Recommendations

We need other research to support the association between depression symptoms and vitamin D by using methods and designs more stronger such as experimental design and research from different regions in the world (different climates).

References


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