

THE PREVALENCE OF VITAMIN D DEFICIENCY AMONG PATIENTS WITH SCHIZOPHRENIA IN DUHOK CITY

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Abstract:

The current cross sectional study, it was aimed to estimate the prevalence of Vitamin D deficiency among 110 patients with schizophrenia in Duhok city, who attended the psychiatric Clinic and Department of Azadi teaching hospital. Their total vitamin D level was measured and the result indicated that vitamin D is below the normal level in more than 76% and deficient in 47%. Statistical analysis of the results showed the presence of a significant difference in incidences between male and female and there were significant increase with the duration of the disease. From the results of the present study concluded that vitamin D deficiency is common in this group of population and most of them were not screened or treated.

Keyword:

Introduction:

Vitamin D is a hormone with the main role on calcium metabolism and keeping bone integrity (Jamilian, *et al.*, 2013). The receptors of Vitamin D are located in different types of cells; the neuronal and glial cells are among them. The enzymes that metabolize Vitamin D are encoded by genes which are expressed in the central nervous system especially the brain (Garcion *et al.*, 2002). Neurogenesis is stimulated by Vitamin D which also it helps in regulation of elements that are neurotrophic, which helps the differentiation of neuronal cells (McCann and Ames, 2007; Brown *et al.*, 2003).

Meta-analyses systematic reviews of population-based cross-sectional studies, controlled trials and prospective cohort researches have revealed that lower levels of serum 25-hydroxy vitamin D₃ (25-OH D) are related with psychiatric symptoms and depressive disturbances (Ju *et al.*, 2012; Anglin, *et al.*, 2013). Globally around 1 billion person have vitamin D deficiency, it affects all age range and ethnic groups. The incidence are on the increase (Holick *et al.*, 2011).

Many recent epidemiological studies support the association between reduced vitamin D levels and psychiatric disturbances in the general population (Maddock, *et al.*, 2013). The previous research from the United Kingdom revealed that vitamin D₃ deficiency is related with an elevated risk of some psychologic disturbances in adulthood. Moreover, Cognitive and memory impairment are linked to vitamin D deficiency (Llewellyn *et al.*, 2008; Lee *et al.*,

2009). Low vitamin D level is also common in patient with schizophrenia and depression in adulthood (Llewellyn *et al.*, 2010; Ganji *et al.*, 2010).

Despite that the importance of the hormone hydroxyvitamine D in schizophrenia has been studied in many epidemiological researches, data are still inconsistent. In a cohort study in Finland, vitamin D supplement was given during the first months after birth, later on showed that incidence of schizophrenia were reduced in the childhood and adult life (Milaneschi *et al.*, 2010). A Danish study showed that neonate with vitamin D deficiency has a double risk of having schizophrenia in the later life (Hoang *et al.*, 2011). Many researchers found that the prevalence of vitamin D deficiency is more common in adult suffering from schizophrenia and they found that the incidence is twice more common than in the general population, but it was not clear which condition predispose to the other (McGrath *et al.*, 2004). However, there were no significance relations in some other studies (McGrath *et al.*, (2010). Few studies showed that incidence of schizophrenia are higher in patient with high serum vitamin D levels (Itzhaky *et al.*, 2012). However, the exposure to sunlight by schizophrenic patients didn't show any improvement of their disease (Norelli *et al.*, 2010); Kendell 2002).

The aim of the present study was to examine the prevalence of Vitamin D deficiency among patients with schizophrenia attending the Department of Psychiatry/ Azadi General Teaching Hospital.

Patients and Methods:

This study included 110 patients, who were previously diagnosed to have schizophrenia and attending outpatient clinic and Psychiatric Department at Azadi Teaching Hospital from 15th Jan. 2015 till 20th Feb. 2015. They were investigated for vitamin D level (after obtaining a verbal consent from patients), a blood sample was taken from each subject and Vitamin D level was estimated by ELISA (ELISA Kit,

Roche Company, Switzerland). The results were interpreted as:

Normal = 30-100 ng/ml
 Insufficient =10-29 ng/ml
 Deficient = less than 10 ng/ml
 Toxicity level= more than 100 ng/ml.

Results:

The characteristics of participants are listed in (table 1).

Table (1): The characteristics of participants

Variables	
Mean age	24.7 yrs
Male patients	59 (53.6%)
Female patients	51 (46.36%)
Mean vitamin D level	23.74
Years of diagnosis of Schizophrenia	5.3 yrs

From (table 2) different levels of vitamin D is noted according to the years of diagnosis of schizophrenia.

Table (2): The level of vitamin D according to depending the years of diagnosis of schizophrenia

No. of patient Percentage		Vitamin D levels	p. value
Less than 5 yrs	More than 5yrs		
20(76.92%)	6(23.07%)	Normal	0.006
21(65.62%)	11(34.37%)	Insufficient	0.077
22(42.3%)	30(57.69%)	Deficient	0.267

The results presented in (table 3) shows that Vitamin D level in schizophrenic patients differs according to gender.

Table (3): Vitamin D level according to gender

Vitamin D Levels	Total	No. of male	No. of female	p.value
Normal	26(23.6%)	19(73.07%)	7 (26.92%)	0.019
Insufficient	32(29.09)	23(71.87%)	9(28.12%)	0.013
Deficient	52(47.27%)	19(36.53%)	33(63.46%)	0.052
Total	110	61	49	

In this study 110 patients who are diagnosed cases of schizophrenia attending psychiatric consultation and department were randomly included in the current study, the mean age was 24.7 years and 59(53.6%) of them were male none of them were previously tested for or treated with vitamin D.

Only 26 patients(23.6%) had normal vitamin level but were in the near lower normal limit. Vitamin D was found to be lower than normal levels in 84(76.36%) of patients, and was deficient in 52(47.27%) patients. These results were statistically highly significant.

In the present study, female have double incidences (68%) of vitamin D deficiency compared with male patient (28.8%), which was statistically highly significant (P. value =0.0012).

Among 110 patients, 49 of them have schizophrenia for more than 5 years and found to be Vitamin D deficient and was more prevalent (67,34%) among those group when compared with (31.14%) those who have the disease for less than 5 years (31.14%). The statistical difference between them was highly significant (P=0.002).

Discussion:

The result of the present study showed a high prevalence of vitamin D deficiency among schizophrenic patients. The result agree with the study that conducted by Valipour *et al.*, (2014). They found that are association between vitamin D deficiency and schizophrenia was very strong. On other hand, (Kesby *et al.*, 2011) found that the average level of vitamin D was lower in schizophrenic patients as compared with the normal subjects, and schizophrenic patients have higher prevalence of vitamin D deficiency.

Furthermore, people with vitamin D deficiency have higher risk of developing schizophrenia (Kiralý *et al.*, 2006).

The result of this study indicate a high prevalence of vitamin D deficiency and this was similar to the result of the study conducted by Belvederi, *et al.*, (2013); Itzhaky *et al.*, (2012); Jamilian, *et al.*, (2013).

In the current study no relationship was found between the severity of schizophrenia and the levels of deficiency of vitamin D. This was the same observation found by (Crews, *et al.*, 2013).

Patients with schizophrenia had significantly lower vitamin D levels when compared with levels of the general population and some studies

showed that the incidence was doubled (Valipour, *et al.*, 2014).

The incidence of vitamin D deficiency increases with the increased duration of schizophrenia especially after 5 years of diagnosis and also we found that female patients have significantly higher incidence of vitamin D deficiency. This may be because of social customs and female clothing leading to reduced times of exposure to sunlight.

The results of the present study concluded that there was high prevalence of vitamin D deficiency among patients with schizophrenia and the incidences were much higher in female and the incidence increase with the duration of the disease.

References

- Anglin, R., Samaan, Z., Walter, S., & McDonald, S. (2013). Vitamin D deficiency and depression in adults: systematic review and meta - analysis. *The British Journal of Psychiatry*, 202(2), 100-107.
- Belvederi Murri, M., Respino, M., Masotti, M., Innamorati, M., Mondelli, V., Pariante, C., & Amore, M. (2013). Vitamin D and psychosis: Mini meta-analysis. *Schizophrenia Research*, 150(1), 235-239.
- Brown, J., Bianco, J., McGrath, J., & Eyles, D. (2003). 1,25 Dihydroxyvitamin D3 induces nerve growth factor, promotes neurite outgrowth and inhibits mitosis in embryonic rat hippocampal neurons. *Neuroscience Letters*, 343(2), 139-143.
- Crews, M., Lally, J., Gardner-Sood, P., Howes, O., Bonaccorso, S., & mith, S. et al. (2013). Vitamin D deficiency in first episode psychosis: A case-control study. *Schizophrenia Research*, 150(2-3), 533-537.
- Garcion, E., Wion-Barbot, N., Montero-Menei, C., Berger, F., & Wion, D. (2002). New clues about vitamin D functions in the nervous system. *Trends In Endocrinology & Metabolism*, 13(3), 100-105.
- Ganji, V., Milone, C., Cody, M., McCarty, F., & Wang, Y. (2010). Serum vitamin D concentrations are related to depression in young adult US population: the Third National Health and Nutrition Examination Survey. *Int Arch Med*, 3(1), 29.
- Holick, M., Binkley, N., Bischoff-Ferrari, H., Gordon, C., Hanley, D., & Heaney, R. et al. (2011). Evaluation, Treatment, and

- Prevention of Vitamin D Deficiency: an Endocrine Society Clinical Practice Guideline. *The Journal of Clinical Endocrinology & Metabolism*, 96(7), 1911-1930.
- Hoang, M., DeFina, L., Willis, B., Leonard, D., Weiner, M., & Brown, E. (2011). Association between Low Serum 25-Hydroxyvitamin D and Depression in a Large Sample of Healthy Adults: The Cooper Center Longitudinal Study. *Mayo Clinic Proceedings*, 86(11), 1050-1055.
- Itzhaky D, Amital D, Gorden K, Bogomolni A, Arnon Y, Amital H. (2012). Low serum vitamin D concentrations in patients with schizophrenia. *IMAJ*, 14(2), 88–92.
- Jamilian, H., Bagherzadeh, K., Nazeri, Z., & Hassanijrdehi, M. (2013). Vitamin D, parathyroid hormone, serum calcium and phosphorus in patients with schizophrenia and major depression. *International Journal Of Psychiatry In Clinical Practice*, 17(1), 30-34.
- Ju, S., Lee, Y., & Jeong, S. (2012). Serum 25-hydroxyvitamin d levels and the risk of depression: A systematic review and meta-analysis. *J Nutr Health Aging*, 17, 447–455.
- Kendell, R. (2002). Exposure to sunlight, vitamin D and schizophrenia. *Schizophrenia Research*, 54(3), 193-198.
- Kesby, J., Eyles, D., Burne, T., & McGrath, J. (2011). The effects of vitamin D on brain development and adult brain function. *Molecular and Cellular Endocrinology*, 347(1-2), 121-127.
- Kiraly, S., Kiraly, M., Hawe, R., & Makhani, N. (2006). Vitamin D as a Neuroactive Substance: Review. *The Scientific World JOURNAL*, 6, 125-139.
- Llewellyn, D., Langa, K., & Lang, I. (2008). Serum 25-Hydroxyvitamin D Concentration and Cognitive Impairment. *Journal Of Geriatric Psychiatry And Neurology*, 22(3), 188-195.
- Lee, D., Tajar, A., Ulubaev, A., Pendleton, N., O'Neill, T., & O'Connor, D. et al. (2009). Association between 25-hydroxyvitamin D levels and cognitive performance in middle-aged and older European men. *Journal Of Neurology, Neurosurgery & Psychiatry*, 80(7), 722-729.
- Llewellyn, D., Lang, I., Langa, K., & Melzer, D. (2010). Vitamin D and Cognitive Impairment in the Elderly U.S. Population. *The Journals Of Gerontology Series A: Biological Sciences And Medical Sciences*, 66A(1), 59-65.
- Maddock, J., Berry, D., Geoffroy, M., Power, C., & Hyppönen, E. (2013). Vitamin D and common mental disorders in mid-life: Cross-sectional and prospective findings. *Clinical Nutrition*, 32(5), 758-764.
- McCann, J., & Ames, B. (2007). Is there convincing biological or behavioral evidence linking vitamin D deficiency to brain dysfunction?. *The FASEB Journal*, 22(4), 982-1001.
- McGrath, J., Saari, K., Hakko, H., Jokelainen, J., Jones, P., & Järvelin, M. et al. (2004). Vitamin D supplementation during the first year of life and risk of schizophrenia: a Finnish birth cohort study. *Schizophrenia Research*, 67(2-3), 237-245.
- McGrath, J., Eyles, D., Pedersen, C., Anderson, C., Ko, P., & Burne, T. et al. (2010). Neonatal Vitamin D Status and Risk of Schizophrenia. *Arch Gen Psychiatry*, 67(9), 889-8894
- Milaneschi, Y., Shardell, M., Corsi, A., Vazzana, R., Bandinelli, S., Guralnik, J., & Ferrucci, L. (2010). Serum 25-Hydroxyvitamin D and Depressive Symptoms in Older Women and Men. *Endocrinology*, 151(6), 2958-2959.
- Norelli, L., Coates, A., & Kovasznay, B. (2010). A comparison of 25-hydroxyvitamin D serum levels in acute and long-stay psychiatric inpatients: A preliminary investigation. *E-SPEN, The European E- Journal Of Clinical Nutrition And Metabolism*, 5(4), e187-e189.
- Valipour, G., Saneei, P., & Esmailzadeh, A. (2014). Serum Vitamin D Levels in Relation to Schizophrenia: A Systematic Review and Meta-Analysis of Observational Studies. *The Journal of Clinical Endocrinology & Metabolism*, 99(10), 3863-3872.

بوخته:

ئارمانج ژ فئى فه كوليني ديار كرنا ريژا كييمونا فيتامين (د) يه لدهؤ نه خوشين توشبووى ب نه خوشيا (شيزوفرينيا) ئهوين سهره دانا كلينيكين تايهت و بهشى نه خوشيين دهرونى ل نه خوشخانا نازادى دكه ن ل باژيري دهوكى. پشتى پيئانا ئاستى فيتامين (د) مه ديت ئاستى وى ژير ئاستى نورماله ل دهؤ 76% ژنه خوشا و گهلهك يا كييمبوو ل دهؤ 47% ژنه خوشا ،ههروهسا جياوازيه كا بهرچاؤ ههبو دناقبهرا ره گهزى نير و مئى 1د و ئهؤ جياوازيه بهرهؤ زيدهبون بو دگهل بسهرچونا دهمى.

د ئهئامدا بو مه ديار بوو فيتامين (د) يئى كييمه ب ريژه كا بهرچاؤ لدهؤ فئى بهشى كومهلگههئى و پرانيا وان نه هاتينه پشكين كرن و چاره سهركرن.

نسبة انتشار نقص فيتامين D لمرضى انفصام الشخصية في مدينة دهوك

الملخص:

ان الهدف من هذه الدراسة هو تقدير نسبة النقص في فيتامين D ل 110 مريضا يعانون من مرض انفصام الشخصية في مدينة دهوك قسم وعيادة الامراض النفسية في مستشفى ازادي التعليمي . تم قياس مستوى فيتامين D اقل من المستويات الطبيعية في 70% ونقص في 47% وهناك فرق معنوي بين الذكور والاناث وهناك زياده معنويه مع وقت الاصابه بالمرض . تم الاستنتاج بان نقص فيتامين D شائع في مجموعه من المجتمع ولكن اغلبهم لم يتم فحصهم ومعالجتهم من هذا النقص.