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Original article

High Prevalence of Hypovitaminosis D in Climacteric and Beyond in a Teaching Center from North Eastern India

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Abstract

Background: Data on the prevalence of hypovitaminosis D in peri and post menopausal tribal multiethnic Indians women living in the North Eastern part of the country are limited. ***Aim:*** To evaluate the vitamin D(VD) level in North Eastern multiethnic tribal perimenopausal and postmenopausal women Indian women. ***Material and Method:*** This prospective study was conducted at a tertiary care centre from 2018 to2019in North Eastern India Catering multiethnic tribal population. A total of498women above 40 years of age who attended gynae opd for various reasons were included in the study Women were advised to give 3 cc blood samples. The serum VD was estimated by Beckman Coulten Unicel DXI immunoassay system using the principle of chemiluminescence, Incidence of Vitamin D deficiency (VDD) and insufficiency (VDI) calculated. VDD was defined as 25(OH) D level in blood<20ng/ml and insufficiency of VD was defined as 25(OH) D levels <30ng/ml/. ***Result:*** In present study mean age was 46.78±6.914 years. 50.40%women were vitamin D deficient. 37.95% women were vitamin D insufficient. Mean parity was 3.94±9.23 and mean value of vit d was 21.36±9.23. ***Conclusion:*** Hypovitaminosis D is highly prevalent among perimenopausal and post menopausal women in the North eastern part of India. The need for improving the levels of vitamin D among this group of population is both vital and urgent.

Keywords: ***Vitamin D, Vitamin D deficiency, Vitamin D insufficiency, Perimenopause, Postmenopause, Hypovitaminosis D***

Introduction

Vitamin D(VD) is a vitamin but it work as a hormone. It has main role in calcium homeostasis. VD endocrine system also has role in cellular differentiation, inhibition of excessive cell growth and in immunomodulation. VD has been linked to Diabetes, hypertension, cancer, metabolic syndrome and in infections. In various review soaring prevalence of vitamin D Deficiency (VDD) has been documented throughout the world[1-3]. Inspite of food fortification not only developed countries affected with VDD but also countries with low altitude with abundant UVB radiation exposure. Approximately one billion people affected worldwide in all ethinicity and age group[4] but There is a scarcity of research regarding VDD in North eastern India in perimenopausal and menopausal women whose menopausal symptoms like moods wings, lack of energy, dizziness, bone and joint pain can be credited to VDD.

This study was conducted to gauge the burden of VDD and find out its predictors among women aged 40 and above in a teaching center from North Eastern India.

Material and method

This prospective study was conducted in the obstetrics and gynecology department from 2018 to 2019. Women aged 40 years and above attending gynecology outpatient department were included in the study. A total of 498 women were recruited. Women taking VD supplements were excluded. Women were also excluded if they had history of medication with drug interfering with calcium and VD metabolism like anticoagulant, thiazide and not willing to participate in the study. Informed consent was taken from all the participants. Confidentiality was maintained. Detailed history was recorded from the recruited women including complete demographic detail, dietary history, past medical and drug intake. Women were advised to give 3 cc blood samples. The serum VD was estimated by Beckman Coulten Unicel DXI immunoassay system using the principle of chemiluminescence. Incidence of Vitamin D deficiency (VDD) and insufficiency (VDI) calculated. VDD was defined as 25(OH) D level in blood<20ng/ml and insufficiency of VD was defined as 25 (OH) D levels <30ng/ml/[5]

Statistical analysis

Descriptive statistics was used to calculate the mean ±Standard deviation (SD). Association between independent and the dependent variable and VD level analyzed using the Pearson's correlation. Simple linear regression and multiple regression analysis was performed All p value<0.05with in 95% confidence interval and 5%level of significance were considered to be statistically significant. Statistical analysis was performed using the SPSS software package (version 22.0: SPSS Inc., Chicago, IL, USA).

Result

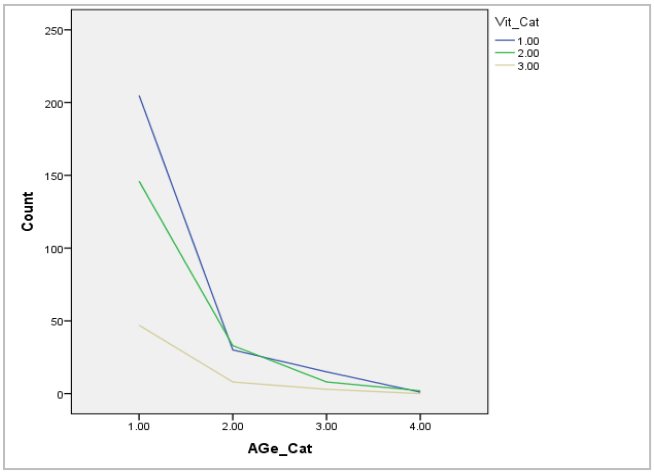
In present study 50.40% women were Vit D deficient and 37.95% women were Vit D Insufficient and only 11.64% women had normal Vitamin D level. Mean age of the women were46.78±6.914 years mean parity was 3.94±9.23 and mean value of vit D was 21.36±9.23.

On pearson correlation in univariate analysis association of VDD/VDI with age is not significant as p value is 0.166. Association with VDD/ VDI with parity is significant as p value is 0.00. No association of VDD/VDI with menopausal status as p value on univariate analysis is 0.226. There is significant correlation socioeconomic (SE) status with VDD/VDI on univariate analysis as p value is0.000.

On Multivariate analysis also also there is significant correlation of parity & SE status with VD level as p value for both is 0.000. In multivariate analysis also there is association of age and menopausal status with VD level is not significant as p value is 0.168 and 0.226 respectively. About 88.8%6women (Majority of women) were showing VDD or VDI (table1) hence chart is showing association of VDD/VDI with age (Chart1)

Table 1: Relationship of age with vitamin D status

Age (years)	VDD	VDI	Normal VD	Total
40-50	205	146	47	398
51-60	30	33	8	71
61-70	15	8	3	26
>70	1	2	0	03
	251	189	58	498



Vitamin D category 1-Vitaminn D deficiency 2-Vitamin D insufficiency 3- Normal Vitamin D

Age category

(1) 40-50years (2) 51-60years (3) 61-70 (4) More than 70 years

Discussion

Our study shows a high prevalence (88%) of Vitamin-D inadequacy among obstetrics and gynecology outpatients of a teaching hospital. All age groups above 40 are prone for the development of Vitamin D inadequacy despite plenty sunshine. Probable reasons for high prevalence of VD inadequacy could be dietary insufficiency of calcium and vit D and insufficient contact to sunlight.

Shillong is situated at 25.57°N 91.88°E. The temperature in the summer varies from 23°C (73°F) and in the winter from 4°C (39°F). Its summers are rainy and cool and winter are chilly cold. People wrap themselves almost whole year. Main diet is rice. Diet is also not rich in VD. People take non vegetarian food irregularly which is rich in VD.

VDD is astonishingly high throughout the world[3]. Inspite of its tropical location and ample sunshine throughout the year, India is not protected to this health challenge[5]. VDD is more commonly occur in women and elderly[6]. VDD is exacerbated in Post-Menopausal Women (PMW). VD synthesis adversely affected as age increases due to estrogen deficiency and age associated changes in VD receptor. Therefore prevalence of VDD is from 50-90% in PMW in western study [7]. In this study prevalence of VDD ranged from 1.6to 86% PMW from the community and from the institution. Another study from Eastern Asia showed VD inadequacy in Postmenopausal women ranged from 0 to 92 % [8].

National data From US showed a significant decrease of VD level from 1988-1994 to 2001-2004[9].

Similar results as in our study have been obtained in few studies in postmenopausal women from India also[10,11,12].

Due to nonspecific symtoms in VDD its difficult to diagnose it most of the time[13]. Clinical cases of VDD are the tip of iceburg. Reason for such a high level of VDD in India is illusion that sunlight is sufficient and there is no need of supplementation.

Many other studies recently recognized moderate to severe VDD in Indian Urban population[5,13,14,15].

Inspite VDD is extensive it is most underdiagnosed and undertreated nutritional deficiency of the globe[1,2,16]. In southAsia and Middle East VDD is severe.[1]

In one more study prevalence of VDD was quite high as 91%. In this study only one participant had normal VD level[17]. Studies from Northen India also showed a very high prevalence of VDD. Various studies showed deficiency of VD in 96% neonate, 91% in healthy neonate, 84% of pregnant women and 78% healthy hospital staff [15,18,19,20,21,22].

A Study from Indian paramilitary focres documented that 14%-32% women of 20-30 years were osteopenic with the fact that these women had proper nutrition, adequate exposure to sunlight and arduous outdoor physical activity[23].

Lo et al reported that for Indians, double UV-B exposure is required to synthesize VD in comparison to Caucasians as in Indian skin pigmentation is more[24] So for Indians 45 minute exposure to sunlight every day will not be sufficient enough to produce optimum level of VD. In Indian diet Vitamin D is very low. VD rich diet is mostly animal in origin while most Indians are vegetarians or occasional nonvegeterian moreover, Indian diet contains high salt which lead to increase urinary calcium Vitamin D insufficiency and inadequate dietary calcium intake leads to further reduction in bone mass and risk of fracture. Estrogen deficiency in perimenopausal and postmenopausal women is linked with increased rate of osteopenia and osteoporosis

It is necessary to find out this group of persons to design and pursue intervention to decrease the dreadful complication of VDD

It is important to find out VD insufficiency in perimenopausal and postmenopausal women, as vitamin D supplementation in these women improves their bone health and prevents fracture. It will be helpful in prevention and management of other health condition like diabetes, allergies, infection and cardiovascular problems.

In present study most of the patient belonged to 40-50 years of age. Mean age is 46years and mean age of menopause is 45.6 years but in all age group there is high incidence of VDD and VDI there is no statistically significant correlation of vit D with age in contrast with two other studies. In one study commonest age affected with vitamin D deficiency is 51-60 years then 45-50 Minimum affection was above 60 years[11]. In another study unlike to our study there was positive association of vitamin D level and late post menopausal age[25]. The probable reason may be the contact of elderly people to medical personnel due to various health issues and they were advised to take VD and calcium supplementation as awareness is increasing about VD deficiency

Another study done by agarwal in post menopausal women between 40-73 years of age found VDD in 83.7%VDI 8.7% and normalwere7.6%only. There definition of VDD and VDI were same as in our study. (Deficiency: <20 ng/ml, Insufficiency: 20-30 ng/ml, Normal: >30 ng/ml[26].

In one more study Paul et al found VD level in postmenopausal women from a semi urban region in Southern India is inadequate[27].

There is no recommendation of population wide screening of VDD by any organization. The American Academy of Family Physicians suggests that there is no evidence of benefit of screening for VDD[28].

National Osteoporosis Foundation, American Geriatric Society, and the American Congress of Obstetricians and Gynaecologists, concludes that measurement of VD level should be done as part of management of osteoporosis[29,30,31].

According to US preventive service task force (USPSTF) and The Endocrine Society also advised same recommendation.[32]

The Institute of Medicine has published the recommended dietary allowance (RDA) for vitamin Dthat is 600IU/day for adults between 19 to 70 years and 800IU/Day for people more than 70 years.[33]

The main strength of the study was large sample size and inclusion of multiple ethnic populations. In present study prevalence of hypovtiaminosis D in peri and post menopausal women is very high. The need for improving the levels of vitamin D among this group of population is both vital and urgent.

Conclusion

In present study prevalence of hypoviaminosia D in peri and post menopausal women is very high. The need for improving the levels of vitamin D among this group of population is both vital and urgent. Emphasis must be given on promoting utilization of vitamin D rich foods and vitamin D supplements. They should also be encouraged to exposure to sunlight. The outcome of our study should be act as a whistle blower for the health policy makers.

Conflicts of Interest

None

Funding Statement

None

References

[1] Mithal A, Wahl DA, Bonjour JP, Burckhardt P, Dawson-Hughes B, Eisman JA, El-Hajj Fuleihan G, Josse RG, Lips P, Morales-Torres J. IOF Committee of Scientific Advisors (CSA) Nutrition Working Group, Global vitamin D status and determinants of hypovitaminosis D. Osteoporos. Int. 2009; 20(11):1807–1820.

[2] Van Schoor NM, Lips P. Worldwide vitamin D status. Best Pract. Res. Clin. Endocrinol. Metab. 2011; 25(4):671–680.

[3] Wahl DA, Cooper C, Ebeling PR, Eggersdorfer M, Hilger J, Hoffmann K, Josse R, Kanis JA, Mithal A, Pierroz DD, Stenmark J, Stocklin E, Dawson-Hughes B. A global representation of vitamin D status in healthy populations. Arch. Osteoporos. 2012; 7(1–2):155–172.

[4] Holick MF, Chen TC. Vitamin D deficiency: A worldwide problem with health consequences. Am J Clin Nutr 2008;87:1080S-6S.

[5] Ritu G, Gupta A. Vitamin D deficiency in India: Prevalence, causalities and interventions. Nutrients. 2014;6(2):729–75.

[6] Lips P. Worldwide status of vitamin D nutrition. J Steroid BiochemMol Biol. 2010;121(1-2):297-300.

[7] Gaugris S, Heaney RP, Boonen S, Kurth H, Bentkover JD, Sen, SS. Vitamin D inadequacy among post-menopausal women: A systematic review. QJM. 2005;98(9):667–76.

[8] Lim SK, Kung AW, Sompongse S, Soontrapa S, Tsai KS. Vitamin D inadequacy in postmenopausal women in Eastern Asia. Curr Med Res Opin. 2008;24(1): 99–106.

[9] Adit A. Ginde,,, Mark C. Liu,, and Carlos A. Camargo Jr. emographic Differences and Trends of Vitamin D Insufficiency in the US Population, 1988–2004.Arch Intern Med. 2009 March 23; 169(6): 626–632

[10] Agarwal N, Mithal A, Kaur P, Dhingra V, Godbole MM, Shukla M. Vitamin D and insulin resistance in postmenopausal Indian women. Indian J Endocr Metab. 2014;18(1):89-93.

[11] Tandon VR, Sharma S, Mahajan S, Raina K, Mahajan A, Khajuria V, et al. Prevalence of vitamin D deficiency among Indian menopausal women and its correlation with diabetes: A first Indian cross sectional data. J Mid-Life Health. 2014;5(3):121-25.

[12] Harinarayan CV. Prevalence of vitamin D insufficiency in postmenopausal south Indian women. Osteoporosis Int. 2005;16(4):397–402.

[13] Goswami R, Gupta N, Goswami D, Marwaha RK, Tandon N, Kochupillai N. Prevalence and significance of low 25‐hydroxyvitamin D concentrations in healthy subjects in Delhi. Am J Clin Nutr 2000;72:472‐5.

[14] Marwaha RK, Tandon N, Garg MK, Kanwar R, Narang A, Sastry A, et al. Vitamin D status in healthy Indians aged 50 years and above. J Assoc Physicians India 2011;59:706‐9.

[15] Arya V, Bhambri R, Godbole MM, Mithal A. Vitamin D status and its relationship with bone mineral density in healthy Asian Indians. Osteoporos Int 2004;15:56‐61.

[16] Van der Meer IM, Middelkoop BJ, Boeke AJ, Lips P. Prevalence of Vitamin D deficiency among Turkish, Moroccan, Indian and sub-Sahara African.

[17] Misra P, Srivastava R, Misra A, Kant S, Kardam P, Vikram NK. Vitamin D status of adult females residing

in Ballabgarh health and demographic surveillance system: A community-based study. Indian J Public Health 2017;61:194-8.

[18] Sachan A, Gupta R, Das V, Agarwal A, Awasthi PK, Bhatia V. High prevalence of Vitamin D deficiency among pregnant women and their newborns in Northern India. Am J Clin Nutr 2005;81:1060-4.

[19] Vupputuri MR, Goswami R, Gupta N, Ray D, Tandon N, Kumar N. Prevalence and functional significance of 25-hydroxyvitamin D deficiency and Vitamin D receptor gene polymorphisms in Asian Indians. Am J Clin Nutr 2006;83:1411-9.

[20] Zargar AH, Ahmad S, Masoodi SR, Wani AI, Bashir MI, Laway BA, et al. Vitamin D status in apparently healthy adults in Kashmir Valley of Indian subcontinent. Postgrad Med J 2007;83:713-6.

[21] Puri S, Marwaha RK, Agarwal N, Tandon N, Agarwal R, Grewal K, et al. Vitamin D status of apparently healthy schoolgirls from two different socioeconomic strata in Delhi: Relation to nutrition and lifestyle. Br J Nutr 2008;99:876-82.

[22] SharmaN,Nath C, Mohammad J. Vitamin D status in pregnant women visiting a tertiary care center of North Eastern India. J Family Med Prim Care.2019;8:356-60.

[23] Tandon N, Marwaha RK, Kalra S, Gupta N, Dudha A, Kochupillai N. Bone mineral parameters in healthy young Indian adults with optimal Vitamin D availability. Natl Med J India 2003;16:298-302.

[24] Lo CW, Paris PW, Holick MF. Indian and Pakistani immigrants have the same capacity as Caucasians to produce Vitamin D in response to ultraviolet irradiation. Am J Clin Nutr 1986;44:683-5.

[25] Asadi M1, Jouyandeh Z, Nayebzadeh F, Qorbani M. Does aging increase vitamin D serum level in healthy postmenopausal women? Acta Med Iran. 2013;51(10):701-4.

[26] Agarwal N, Mithal A, Dhingra V, Kaur P, Godbole MM, Shukla M, et al. Effect of two different doses of oral cholecalciferol supplementation on serum 25-hydroxy-vitamin D levels in healthy Indian postmenopausal women: A randomized controlled trial. Indian J Endocrinol Metab 2013; 17: 883-9.

[27] Paul TV, Thomas N, Seshadri MS, Oommen R, Jose A, Mahendri NV, et al. Prevalence of osteoporosis in ambulatory postmenopausal women from a semiurban region in Southern India: Relationship to calcium nutrition and Vitamin D status. Endocr Pract 2008;14:665 71.

[28] American Academy of Family Physicians. Recommendations by Type: Clinical Preventive Services. Leawood, KS: American Academy of Family Physicians; 2014.

[29] Committee on Practice Bulletins-Gynecology, American College of Obstetricians and Gynecologists. ACOG Practice Bulletin No. 129. Osteoporosis. Obstet Gynecol. 2012;120:718-34.

[30] American Geriatrics Society. AGS/BGS Clinical Practice Guideline: Prevention of Falls in Older Persons. New York: American Geriatrics Society; 2010.

[31] National Osteoporosis Foundation. Clinician's Guide to Prevention and Treatment of Osteoporosis. Washington, DC: National Osteoporosis Foundation; 2014.

[32] Holick MF, Binkley NC, Bischoff-Ferrari HA, Gordon CM, Hanley DA, Heaney RP, et al; Endocrine Society. Evaluation, treatment, and prevention of vitamin D deficiency: an Endocrine Society clinical practice guideline. J Clin Endocrinol Metab. 2011; 96:1911-30.

[33] Institute of Medicine. Dietary Reference Intakes for Calcium and Vitamin D. Washington, DC: National Academies Press; 201.