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Research Article

SUNLIGHT: A BOON TO HUMAN HEALTH

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ABSTRACT

The high incidence of breast cancer is emerging as a major public health problem in Kerala. The prevalence of breast cancer in Kerala is much above the national average. It was reported that about 90 percent of the population in Kerala suffers from Vitamin D deficiency (VDD), which is more common in the affluent class and in some places in North Kerala where women wore dress which cover their bodies. The availability of Vitamin D is affected by various nutritional, physiological and environmental variables including cultural and traditional practices and use of Sunscreens with high Sun Protection Factor (SPF) above 15. The present study pursuits the association between Vitamin D and incidence of breast cancer. The study protocol was approved by IRB of Amala Institute of Medical Sciences, Kerala and signed informed consent was taken from the study subjects prior to the start of the study. Subjects who were newly diagnosed with breast cancer were selected using purposive sampling. Demographic and lifestyle variables of the subjects were collected by using suitably structured interview schedule. Biochemical variables like Serum Vitamin D, Calcium and oestrogen levels. SPSS version 24 was used for data analysis to find out Mean, standard deviation and correlation. Results of the study indicated that majority of breast cancer subjects were deficient with Vitamin D in which their life style factors played a role in making them deficient.

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INTRODUCTION

Kerala is facing a major public health problem-the high incidence of breast cancer. The breast cancer incidence in the State is much above the national average. About 1,200 new cases registered at the Regional Cancer Centre alone annually. Among the nutritional factors, recent studies indicated that, Vitamin D status in the body has a potential role in the aetiology of breast cancer. *In vivo* and *in vitro* studies have shown that 1,25(OH)₂D and its receptor can induce differentiation and inhibit cellular proliferation in breast tumor tissue. Research suggests that higher risk of breast cancer is seen among women with low level of vitamin D. Vitamin D may play a role in controlling normal breast cell growth and may be able to stop breast cancer cells from growing. The Kerala youth who had become more beauty conscious than their predecessors in their attempt to enhance complexion shun sunlight more than ever before. This in turn had set off a series of life style related disorders caused by the deficiency of Vitamin D, which is activated only with the exposure of sunlight. The modern life styles that require people to remain

confined in offices, flats or indoor gyms have been responsible for this alarming situation. According to a latest report over 90 percent of the population in Kerala suffers from Vitamin D deficiency, which is more common in the affluent class and in some places in North Kerala where women cover their bodies in full length gowns. Even though there is abundant sunlight in Kerala, the availability of Vitamin D is affected by various nutritional, physiological and environmental variables including cultural and traditional practices and use of Sunscreens with high Sun Protection Factor (SPF) are thought to be at greater risk for vitamin D deficiency. However, data in Kerala populations are limited. The human body can make its own vitamin D when exposed to sunlight unlike other vitamins. This vitamin is essential for overall good health and strong bones and also plays an important role in the functioning of your muscles, brain, lungs and heart and ensures that your body fights infection. The present study pursuits the association between Vitamin D and incidence of breast cancer.

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METHODOLOGY

The study protocol was approved by IRB of Amala Institute of Medical Sciences Kerala and signed informed consent was taken from the study subjects prior to the start of the study. Subjects who were newly diagnosed with breast cancer were selected using purposive sampling. About 75 newly diagnosed breast cancer subjects were selected by purposive sampling. Post-menopausal women and those who were undergoing many medications were excluded from the study. They provided demographic and lifestyle information using interview schedule. Blood sample were collected. Serum vitamin D, calcium, estradiol, PTH, and ferritin levels were biochemically, analysed. Vitamin D deficiency was considered at serum level less than 50 nmol/L, suboptimal vitamin D levels were considered between 50 and 75 nmol/L and optimal levels were more than 75-250 nmol/L. The 25-hydroxy vitamin D test is the best way to monitor vitamin D levels. The amount of 25-hydroxyvitamin D in blood was a good indication of how much vitamin D your body has.

RESULTS AND DISCUSSION

Age Distribution of Breast Cancer Subjects N=75

Age(years)	Frequency	Mean level of Vitamin D(nmol/L)
15-20	1(1.33%)	41 ± 0
30-35	5(6.67%)	51.16 ± 9.39
36-40	21(28%)	38.04 ± 12.15
41-45	20(26.67%)	42.61 ± 17.02
46-50	28(37.33%)	48.63 ± 27.74

P value by ANOVA = 0.427

Among the sample the breast cancer age range was mostly found to lie between 46-50 years.50 percent of the breast cancer reported in Kerala was occurring in people less than 50 years of age in Kerala (Deccan Chronicle,2016)

Frequency of sample with the range of Vitamin D level

Vitamin D level(nmol/L)	Frequency (N=75)	Mean ±SD	Minimum Vitamin D level (nmol/L)	Maximum Vitamin D level (nmol/L)
75-250(Normal)	4(5.33%)	99.143 ± 39.24	79.5	158
50-75 (Insufficiency)	18(24%)	59.2 ± 5.60	50.8	71
<50(Deficiency)	53(70.67%)	34.85 ± 11.28	12.92	49.9

Among the breast cancer subjects majority (70.67) of the sample were deficient with Vitamin D. About 24% were insufficient. Only 5.333% were having normal values. In a State like Kerala which enjoys abundant sunshine for the best part of the year, it is indeed strange that a significant chunk of the population is deficient in vitamin D (The Hindu, 2014). According to a study published in the American Association for Cancer Research, when the Vitamin D level in the blood was doubled to 50ng/ml, there was an 83% reduction in Breast Cancer (American Association for Cancer Research, 2008)

Association between Vitamin D level and Estrogen, Calcium, Parathyroid hormone(PTH) and Ferritin levels

Classification of Vitamin D level (nmol/L)	Estradiol (pg/ml) (Mean±SD)	Calcium (mg/dl) (Mean±SD)	PTH (pg/ml) (Mean±SD)	Ferritin (ng/ml) (Mean±SD)
75-250 (Normal)	30.72 ± 35.91	9.025±0.708	47.3±3.81	51.1±9.42
50-75 (Insufficiency)	68.86 ±30.98	9.03±0.68	41.17±4.49	125.24 ± 153.58
<50 (Deficiency)	105.88 ±254.47	8.98±0.619	48.70±44.01	161.73± 291.15

Table shows that estradiol level were being normal for the subjects. Calcium and PTH hormone were also found to be normal for sample with normal vitamin D level. Vitamin D deficiency causes a decrease in ionized calcium in blood. This leads to an increase in the production and secretion of parathyroid hormone (PTH). PTH stimulates the mobilization of calcium from the skeleton, reduces loss of calcium from the kidneys. The result is normal fasting serum calcium. So, vitamin D deficiency is characterized biochemically by either normal, or low-normal, serum calcium with a low-normal, or low-fasting, and an elevated serum PTH. A low vitamin D, and a calcium level above 10.1, then you are almost guaranteed to have primary hyperparathyroidism. PTH levels are often elevated in patients with vitamin D insufficiency, indicating secondary hyperparathyroidism (Norman, Goodman and Politz,2011). Deficient people were having high ferritin levels which were normal compared with the people with normal vitamin D level. Low vitamin D level and high ferritin levels were biomarkers for the diagnosis of many diseases especially autoimmune diseases.

Life Style Factors

Life Style Factors	Normal (n=4)	Insufficiency (n=18)	Deficiency (n=53)
Consumption of Non Veg	4 (100%)	18(100%)	50(94.33%)
Use of sunscreen cream/lotion	-----	-----	10(18.87%)
Usage of umbrella	-----	15(83.33%)	45(84.90%)

Almost all the sample consumed nonveg foods. About 18.87 % sample among deficient vitamin D, had the habit of using sunscreen lotions or cream. Usage of umbrella was very common in Kerala during sunny days even for a short distance. 84.90 %sample among those who were deficient in vitamin D had the usage of umbrella in sunny days. Among sample those who were insufficient in vitamin D, 83.33% were using umbrella.

Duration of Exposure to Sunlight

Duration	Normal (n=4)	Insufficiency (n=18)	Deficiency (n=53)
Less than 10 minutes	-----	6(33.33%)	9(16.98%)
10 minutes	-----	12(66.67%)	25(47.17%)
20 minutes	3(75%)	-----	5(9.43%)
30 minutes	-----	-----	11(20.75%)
1 hour	-----	-----	3(5.66%)
More than 1 hour	1(25%)	-----	-----

Among the sample in normal sample 75% subjects had an exposure about 20 minutes. In insufficiency group 66.67% sample were exposed to sunlight only for 10 minutes. Out of 53 deficient Vitamin D status subjects, 47.17% people were

exposed to sunlight for 10 minutes and 20.75% 16.98% for less than 10 minutes only.

CONCLUSION

About 50% of the world's population is affected by vitamin D insufficiency. It is very common in all age groups. Since dietary sources for vitamin D remained in a few food items and also most of the people did not eat healthy enough to get adequate amounts of this vitamin, the primary source for vitamin D is SUN. But people nowadays were becoming more beauty conscious, as tanning by sunlight might look them darker, scared of skin allergies and skin cancer and other skin problems. But many studies have proved that people exposed to good amount of sunlight could reduce the risk of many life style disorders especially breast and colon cancer. So a sensible sun exposure on bare skin for 5-10 minutes 2-3 times per week could maintain a sufficient vitamin D level in human body.

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