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RESEARCH ARTICLE

A STUDY OF SERUM VITAMIN D LEVEL IN THE ADULT POPULATION OF DISTRICT SHOPIAN

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Abstract

Background: Vitamin D is a steroid hormone that can be synthesized in epithelial cells of the skin but its deficiency can have deleterious effects on health. Vitamin D deficiency prevails in epidemic proportions all over the Indian subcontinent, with a prevalence of 70%–100% in the general population.

Objective: To assess the serum Vitamin D level in the adult population of district Shopian.

Method: We sampled 126 consenting participants aged 18 years and above who attended the hospital for common reasons randomly and their serum vitamin D levels determined after proper and detailed history.

Results: Of the 126 consenting participants 27 were male which corresponded 21.43% and 99 were female which corresponded to (78.57%) of the sample size. We had 44 participants in the age group of 20-29 years, 33 in the age group of 30-39 years, 17 in the age group of 40-49 years and finally 32 participants 50 and above years. 43.65% were found to be deficient, 24.60% were found to be insufficient and only 31.75% were found to be sufficient. The lowest level was 5.0 ng/ml.

Conclusion: This study finds that the prevalence of Vitamin D deficiency is very high in the natives of district Shopian & a survey with a very large sample size be conducted with emphasis on the supplementation of vitamin D on the recommended guidelines.

Introduction:-

The source of vitamins is food products. Vitamin D is a steroid hormone[1] that can be synthesized in epithelial cells of the skin[2] and hence is actually not a vitamin in true sense[3]. It is important for growth and development of skeletal tissues and regulates calcium and phosphorus metabolism in the body. 90–95% of the vitamin D in the human body is synthesized in the skin by the effect of sun rays. Vitamin D is available in two forms, D2 and D3. Vitamin D3, also known as cholecalciferol is mainly derived from animal sources as fish liver oils fatty fish and egg yolks; it is also produced in the human skin[4]. Vitamin D is required for calcium absorption from the gut & hence, its deficiency can have deleterious effects in children[5]. There has been discussion on what should be called as vitamin D deficiency and the current agreement is that a 25(OH)D concentration of less than 20 ng/mL (<50 nmol/L) should

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be labeled as vitamin D deficiency which is endorsed by US Endocrine Society and a level between 21–29 ng/mL as insufficiency. Levels above 30 ng/mL are supposed to be sufficient[6]. The reason for this is that the calcium absorption from the intestines is enhanced above 32 ng/mL. Vitamin D intoxication has been labeled if the levels surpass 150 ng/mL[7]. Vitamin D deficiency prevails in epidemic proportions all over the Indian subcontinent, with a prevalence of 70%–100% in the general population[8] and as much as 40% of European population is vitamin D deficient, and 13% are severely deficient[9]. The main storage form of vitamin D is 25-hydroxyvitamin D [25(OH) D], which is converted to a biologically active form 1, 25-dihydroxy vitamin D [1, 25 (OH) 2D] in kidneys[10].

Material & Method:-

This study was conducted at district hospital Shopian in adults aged 18 years and above. We had a total of 126 consenting adult participants, of which 27 (21.43%) were male 99 (78.57%) were female. As said, a proper consent was taken from the participants.

Exclusion criteria:

We excluded any participant having any significant underlying medical illness, any acute or chronic liver or kidney disease or taking any medication including vitamin D was excluded.

Serum vitamin D (25 OH D) levels were measured by chemiluminescence immunoassay (CLIA) method. We chose 25 (OH) D to be measured in the serum due to its long half-life of 2-3 weeks which reflects the true status of vitamin D levels. 1, 25 (OH)2 D (Calcitriol) has a half-life of around 4 hours only and hence does not reflect the true status of its stores[11]. A serum vitamin D level of less than 20 ng/ml (50 nmol/l) was classified as deficiency as advocated by US Endocrine Society classification.

Data analysis was done by using test statistics. Variables were summarized as frequency and percentages. The qualitative data was analyzed using Chi Square test. The data was analyzed using Statistical Package for Social Sciences (SPSS) version 20.

Results:-

As we had a total of 126 consenting participants, of which 27 were male which corresponded 21.43% and 99 were female which corresponded to (78.57%) of the sample size. We had 44 participants in the age group of 20-29 years of which 8 (18.18%) were male and 36 were female (81.82%) participants, 33 in the age group of 30-39 years of which 4 (12.12%) were male and 29 were female (87.87%) participants, 17 in the age group of 40-49 years of which 5 (29.41%) were male and 12 were female (70.59%) participants and finally 32 participants 50 and above years of which 10 (31.25%) were males and 22 were females (68.75%). There was no participant less than twenty years old and hence our study was practically of participants 20 years and above. Of the 126 participants, 43.65% were found to be deficient of which 7.94% were males and 37.71% were females, 24.60% were found to be insufficient of which 9.52% were males and 15.1% were females and only 31.75% were found to be sufficient of which 3.97% were males and 27.7% were females. The highest level was 143.00 ng/mL and the lowest level of 5.00 ng/ml. The data is tabulated below:

Table 1:- Gender distribution in the participants under study.

Gender	Number	Percentage
Male	27	21.43%
Female	99	78.57%

Table 2:- Different parameters like age group, number, gender, and vitamin D level of the participants under study.

		Vitamin D level (ng/ml).				
Age group (in years) & Number & Percentage	Gender	Upto 20 ng/ml	21-29 ng/ml	>30 <150 ng/ml	>150 ng/ml	Total no. & Percentage
20-29. N=44. (34.92%).	M	3	2	3	0	8
	F	23	8	5	0	36

30-39. N=33. (26.19%).	M	2	2	0	0	4
	F	9	5	15	0	29
40-49. N=17. (13.49).	M	2	1	2	0	5
	F	5	1	6	0	12
50 & 50+. N=32. (25.40%).	M	3	7	0	0	10
	F	8	5	9	0	22
Total number N=126. 100%.	M	10	12	5	0	27 (21.43%)
	F	45	19	35	0	99 (78.57%)

Table 3:- Vitamin D status in the participants under study.

Vitamin D status	Percentage	Gender & Percentage	
Deficient	43.650%	M	7.94%
		F	35.71%
Insufficient	24.600%	M	9.52%
		F	15.10%
Sufficient	31.746%	M	3.968%
		F	27.78%
Toxicity	0.00%	M	0.00%
		F	0.00%

Some important parameters and results of highs and lows of the participants are summarized below as:
Age: 18 years & above.
Gender: Males 27 (21.43%) & 99 (78.57%) females.
Minimum 25-OH D levels overall: 5.00 ng/mL.
Maximum 25-OH D levels overall: 143.00 ng/mL.
Minimum 25-OH D levels in 20 to 29 years: 5 ng/mL.
Maximum 25-OH D levels in 20 to 29 years: 130 ng/mL.
Minimum 25-OH D levels in 20 to 29 years in males & females respectively: 9 ng/ml &5 ng/ mL.
Maximum 25-OH D levels in 20 to 29 years in males & females respectively: 130 ng/ml 100 ng/ mL
Minimum 25-OH D levels in 30 to 39 years: 10.74 ng/ mL
Maximum 25-OH D levels in 30 to 39 years: 128 ng/ mL.
Minimum 25-OH D levels in 30 to 39 years in males & females respectively: 15.52 ng/ml & 10.74 ng/ mL.
Maximum 25-OH D levels in 30 to 39 years in males & females respectively: 125 ng/ml & 128 ng/ mL.
Minimum 25-OH D levels in 40 to 50 years: 9 ng/mL.
Maximum 25-OH D levels in 40 to 50 years: 134 ng/mL.
Minimum 25-OH D levels in 40 to 50 years in males & females respectively: 13 ng/ml & 9 ng/mL.
Maximum 25-OH D levels in 40 to 50 years in males & females respectively: 75 ng/ml & 134 ng/mL.
Minimum 25-OH D levels in 50 years above:10 ng/mL.
Maximum 25-OH D levels in 50 years above: 143 ng/mL.
Minimum 25-OH D levels in 50 years above in males & females respectively: 10 ng/mL & 10 ng/mL.
Maximum 25-OH D levels in 50 years above in males & females respectively: 143 ng/mL & 70 ng/mL.

Discussion:-

For a healthy metabolic state, calcium is very important and for a good homeostasis of calcium, vitamin D is of paramount significance. In this part of the world, the vitamin D inadequacy is very common and supplements are usually not taken. In this study we found that a huge proportion of participants are vitamin D deficient irrespective of age and gender, the magnitude of which can deduced from the fact that 43.65% were found to be deficient and 24.60% were found to be insufficient.

Similar studies have shown a comparable data as in a study conducted by Mansoor[12] et al with 90% showing low serum 25(OH) D levels: 69.9% had deficient and 21.1% had insufficient levels of 25(OH) D and Kader et al[1] with <10 ng/mL of vitamin D in 83.8% of women and 18.2% of men, while levels between10-30 ng/mL of vitamin D was found in 69.6% of women and 30.4% of men. In another study by Liu[13] et al, the prevalence of VDD & VDI was found in 28.9 and 41.4 % respectively (70.3% combined).

The lowest level of vitamin D was 5.0 ng/ml in a lady of the age group of 20-29 years which reflects the magnitude of the burden of the problem and inadequacy of the supplementation. Although this study was conducted in the hospital, we received participants from nearly all the areas of the district, different ages and gender and different communities. In order to find the deficiency in the valley of Kashmir, we need to conduct a study with sample from all the districts of the valley. The Vitamin D should be supplemented in a daily dose as recommended. When 1000 IU vitamin D is taken daily over a period of few weeks in addition to what one is ingesting, the serum levels increase by 10 ng/mL[14], which reflects the magnitude responsibility on the shoulders of the health care workers in prescription of vitamin D judiciously.

Limitations:

There were few limitations of the study as given below:

1. Small sample. Although we had fairly a good number of participants, but a bigger sample size might have been better.
2. The study was conducted in autumn, winter and spring with lesser amount of sunlight. Samples taken in summer could have given a much better idea regarding the results.

Declarations:

Funding:

None.

Conflict of interest:

None.

Conclusion:-

This study reveals that the serum vitamin D levels in the natives of district Shopian are low in about 68.25% (deficient or insufficient) and a daily recommended dose should be prescribed by the concerned health care workers and a very large study must be conducted in the district and the whole valley for the same reason.

Recommendation:-

We strongly recommend a proper diet and exposure to the sunlight and above all the supplementation of vitamin D to all in the recommended daily doses so that the level doesn't go too low to affect the metabolism.

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