



VITAMIN D STATUS IN VARYING AGE GROUPS OF BOTH THE GENDERS.

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ABSTRACT

Vitamin D deficiency is widespread in all age groups worldwide. Majority of the population is unaware of this and also the role of Vitamin D in health care aspect apart from skeletal metabolism and calcium homeostasis. Vitamin D levels measured in 3320 subjects. Both males and females were included. Sixty-five percentage of subjects were deficient in Vitamin D 22.9% insufficient and only 12.5% had sufficient levels of Vitamin D. Older people had higher Vitamin D levels compared to adolescents and younger children. The overall analysis points out higher Vitamin D levels in females of older age groups.

KEYWORDS : Vitamin D Deficiency, Measures To Manage Vitamin D Deficiency.

INTRODUCTION

Vitamin D deficiency is one of the most common nutritional deficiencies in all age groups worldwide. Globally one billion individuals are vitamin D deficient. Its major role is in bone metabolism and Ca homeostasis. According to International Osteoporosis Foundation in 2009, 90% of neonates, 91% of healthy school girls, 78% of healthy hospital staff and 89% of pregnant women in North India were diagnosed as hypervitaminosis D. Causes of Vitamin D deficiency includes inadequate exposure to sunlight, obesity, fat malabsorption syndrome and drugs like anticonvulsants. Granuloma forming disorders, lymphomas and primary hyperparathyroidism can cause a high risk of developing Vitamin D deficiency. Additionally, it results in skeletal mineralisation defects, bone deformities, short stature leading to increased risk of falls and fractures, muscle pain, muscle weakness increased cardiovascular risk, diabetes, pre-diabetes, polycystic ovarian syndrome, infections, autoimmune disorder, sleep disturbance and pain.[1]

As per the endocrine society, screening of vitamin D is recommended in individuals with rickets, Osteomalacia, Osteoporosis, chronic kidney disorders, hepatic failure, malabsorption syndrome, cystic fibrosis, inflammatory bowel diseases, Crohn's diseases, radiation entities, bariatric surgery and hyperparathyroidism[2]. Exposure to sunlight can improve Vitamin D status [3]. Vitamin D deficiency increases cardiovascular diseases, diabetes, pre-diabetes and dyslipidemia which demands focus on health promotion and lifestyle intervention in both men and women. The reports on Vitamin D levels in south India are few compared to other parts of India [4].

MATERIALS & METHOD

The OP/IP patients of SK Hospital formed the core of the study. The vitamin D3 levels measured in 3320 subjects of the varying age group of both the genders. They were divided into groups based on age <20, 21-30, 31-40, 41-50, 51-60, 61-70, and >70. Each group subdivided into Deficient (<20 ng/mL), Insufficient (21-29 ng/mL), and Sufficient based on Vitamin D level. Vitamin D was measured by CMIA method using Abbott i1000SR analyser. Blood collected using disposable syringes in clot activator collection tubes. Serum separated and Vitamin D level measured on the day of the collection itself.

RESULTS

The serum level of Vitamin D was measured in 3320 subjects. Males and females were included and the percentages are 31.1 and 69.9% respectively. [Figure - 1]. The subjects were divided into 7 groups based on age. They were <20, 21-30, 31-40, 41-50, 51-60, 61-70 and >70. The distribution of cases based on age is presented in figure 2. Male patients below the

age of 50 years were less in number compared to those above 50 years of age. It ranged between 5.4% and 9.3% while it was 18.7, 27.5 and 25.7 in age groups 51-60, 61-70 and >70. Female subjects were more or less at the same level (30-60%) in different age groups. The maximum patients were in the age groups 21-30 years and minimum in the age group below 20. More than half of the total patients were above the age of 50 while that in the younger age group was lesser in no. The no of subjects in the age group <20 years is the lowest (5.9%).

Taking Vitamin D levels as criteria the patients were divided into 3 groups. Deficient (<20 ng/mL), Insufficient (20-29 ng/mL), Sufficient (>30 ng/mL).

Table-1 illustrates the distribution of patients into deficient, insufficient and sufficient groups. Lowest no. of patients was in the sufficient group (12.6%) while the majority (64.5%) has Vitamin D at deficiency levels. Insufficient level found in 22.9% of subjects.

The distribution of deficient, insufficient and sufficient groups based on age is given in table-2. More than half of the subjects in age groups 51-60, 61-70 and >70 were deficient while 69.1%, 78.9%, 82.4% and 69.3 percentages in age groups <20, 21-30, 31-40, 41-50. Thus Vitamin D level is higher in elderly people above 50 years and lower in younger age groups. Sufficient Vitamin D levels found in about 20% of the patients of age above 60 years while it was much lower in the subject below the age of 60.

Distribution of male and female cases based on age and levels of Vitamin D indicate that up to the age of 40 years female predominates over the males. Below the age of 40 years, there was no pattern. Up to the age of 40 years, male subjects were more than females. The percentage of insufficient individuals is the same in both genders in the age group 41-50, 51-60, but males predominate in the age group 61-70 and >70.

In insufficient group equal percentage in female and male, in the age group 41-50 and 51-60. Male subjects of insufficient group higher in age groups 61-70 and >70. But in younger age groups <20, 21-30, 31-40 females were only half that of males. Subjects with adequate levels were more in females of age <20 but equal in the age group 51-60, >70.

Overall analysis shows of Vitamin D state it is better in older people compared to young, adolescent, and children.

DISCUSSION

Vitamin D deficiency is a worldwide epidemic and yet it is a problem that is largely unknown by the majority [5]. Wides

pread prevalence in all age groups including toddlers, school children, men, women, elderly , pregnant women, neon ates both in rural and urban areas have been documented [6].

In the present study, 3320subjects were analysed for Vitamin D status. Surprisingly 64.5 % were deficient, 22.9% were insufficient and only 12.6% had sufficient Vitamin D level (30ng/mL). These findings are in agreement with that reported by Sandhiya Selvarajan et al. [7] Vitamin D deficiency is reported in 70% -90% across all age groups. The average level is 3.15 ± 1.9 to 52.9 ± 33.7 ng/mL. They observed high Vitamin D levels in males compared to females. However, in the present study overall Vitamin D level is higher in females than males. It should be noted that there is a disparity in no of females and males. Vitamin D level is found to be significantly low in adolescent age but comparatively higher in older age groups. One of the major reasons for the widespread nutritional disorder is the lack of awareness about the importance of Vitamin D in health benefits and prevention of deficient state. Awareness and education campaigns about Vitamin D at the community level together with normal and high-risk population could help to prevent at least long term complications.

The level of inadequate Vitamin D has been reported in medical students also by Yanghe et al 2017[8]. Primary education targeting the younger population is known to increase the likely hood of positive health behaviour. Educating medical students has a twofold opportunity of targeting on the section of the general population who would also be in future health promoters of the community. Medical students who are an integral part of health, health-related programmes of the community at large and should, therefore, be the ideal person for indicating long term complications. The next-generation professionals could influence the progression of the future health education process, policy development and formation of social norms of health and health promoters behaviours.

Table No- 1
EFFECTIVE SIZE OF GROUPS BASED ON VITAMIN D LEVEL.

Deficient	%	Insufficient	%	Sufficient	%	Total	%
2141	64.5	760	22.9	419	12.6	3320	100

DEFICIENT (<20 ng/mL). INSUFFICIENT (20-29 ng/mL). SUFFICIENT (>30 ng/mL).

Table No-2
DISTRIBUTION OF CASES BASED ON AGE AND VITAMIN D LEVEL.

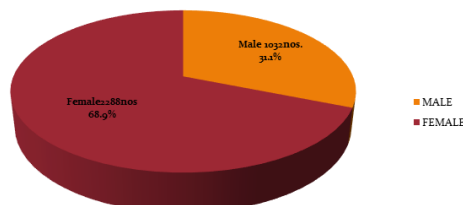
	<20		21-30		31-40		41-50		51-60		61-70		>70	
	No	%	No	%	No	%	No	%	No	%	No	%	No	%
Deficient	137	69.1	431	78.8	346	82.4	282	69.3	300	58.9	325	51.3	328	52.7
Insufficient	37	18.8	95	17.4	53	12.6	89	21.9	135	26.6	173	27.3	178	29.3
Sufficient	23	11.7	21	3.8	21	5.0	36	8.8	74	14.5	135	21.3	109	18
Total	197	100	547	100	420	100	407	100	509	100	633	100	607	100

Based on age study group divided into <20. 21-30. 31-40. 41-50. 51-60 . 61-70 . >70

Table No-3
EFFECTIVE SIZE OF STUDY GROUP BASED ON AGE, GENDER AND VITAMIN D LEVEL.

	<20		21-30				31-40				41-50				51-60				61-70				>70					
	M	%	F	%	M	%	F	%	M	%	F	%	M	%	F	%	M	%	F	%	M	%	F	%	M	%	F	%
Deficient	36	60.7	101	70.6	40	61.5	391	81.6	52	66.7	294	86	68	73.1	214	68.2	115	59.6	185	58.5	128	45.1	147	57	136	51.3	184	53.8
Insufficient	16	29.6	21	14.7	22	33.9	73	15.2	17	21.8	30	10.5	21	22.6	68	21.9	51	26.4	84	26.6	87	30.6	86	25	83	31.3	95	27.8
Sufficient	2	3.7	21	14.7	3	4.6	18	3.7	9	11.5	12	3.5	4	4.3	32	10.2	27	14	42	14.9	69	24.3	16	18	46	17.4	63	18.4
Total	54	100	143	100	65	100	482	100	78	100	336	100	93	100	314	100	193	100	311	100	284	100	249	100	265	100	342	100

Figure- 1 MALE AND FEMALE CASE OF THE STUDY GROUP



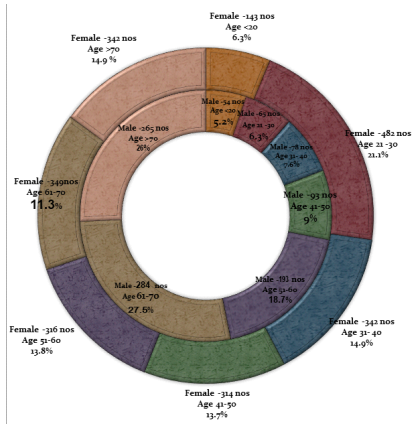
The results of the present study reveal an alarmingly higher Vitamin D deficiency in spite of the fact that our state and country at large have adequate and even at times higher levels of sunshine. The results are in agreement with the findings reported by Amal et al 2019 [9]. In Abudabi population vast majority of 72% were deficient 10% insufficient and only 4.1% (>75mmol/L) had adequate Vitamin D in spite of adequate sunshine. The result obtained in the present study also reveals an appreciably high prevalence of Vitamin D deficiency despite the fact that participants live in a sunny area. Several factors like inadequate exposure to sunlight, atmospheric pollution, low physical activity, clothing cultural and dietary habits, absence of adequate fortified foods etc.

More awareness is needed to compact the increasing level of Vitamin D inadequacy in all age groups across the country. The extremely high prevalence Vitamin D deficiency point to the need for preventive measures and treatment of such individual and population. The present situation demands framing proper training modules that could help in identification, prevention and treatment of Vitamin D deficiency and increased awareness at an early stage which could install adoption of health-related behaviour at a personal and professional level.

CONCLUSIONS

The present study reveals the prevalence of vitamin D deficiency in all age groups. It is alarmingly low in the younger age group (<30 ng/mL) compared to older (above 50 years). The younger population is at high risk for developing Vitamin D deficiency and its comorbidities. There is an urgent need to frame a proper module to identify, prevent and treat Vitamin D deficiency. Awareness at a young age could result in the adoption of health-related behaviour at a personal and professional level.

Figure- 2 Percentage of study subjects based on age and gender.



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