Vitamin D status among individuals attended in Health Home Care Centre, Lalitpur, Nepal

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ABSTRACT

There is widespread prevalence of vitamin D deficiency from new-born to infancy, childhood and adult male and female. Despite the numerous reports of the association of vitamin D with spectrum of development, disease treatment and health maintenance, vitamin D deficiency is common. There is limited information of the vitamin D status in Nepalese people. Based on the information in relation to importance of Vitamin D, we proposed to see the level of vitamin D among the care seeker individuals attended in this Health Home Care Centre, Nepal. Within three months interval (March to May 2012), whole blood test was done by 148 individuals. Among them vitamin D3 test was recommended for 50 individuals done by doctor on the basis of relevant health problems in relation to vitamin D deficiency. Analysis was done with SPSS package 17 version to see the relation between Vitamin D deficiency and other health related tests. The study found significant association between vitamin D deficiency with calcium level and hemoglobin level. There are presences of studies with evidences regarding relation of vitamin D with different health outcomes in different parts of the world. The widespread deficiency of vitamin D merits consideration of widespread policies including increasing the awareness among the public and health care professionals. In addition the study results highlight the need for additional high quality studies in Nepal in order to prevent the impacts of vitamin D deficiency and also to plan for prevention of vitamin D deficiency.

Keywords: Vitamin D, deficiency, health indicators.

INTRODUCTION

Known as the sunshine vitamin, vitamin D is produced by the body in response to sunlight. It is also occurs naturally in a few foods -- including some fish, fish liver oils, and egg yolks -- and in fortified dairy and grain products.[1]

Vitamin D is essential for strong bones because it helps the body to use calcium from the diet. Traditionally, vitamin D deficiency has been associated with rickets a disease in which the bone tissue doesn't properly mineralize, leading to soft bones and skeletal deformities.[2] It can be considered the tip of the vitamin D–deficiency iceberg. Increasingly, research is revealing the importance of vitamin D in protecting against a host from different health problems. In fact, vitamin D deficiency remains common in children and adults. In utero and during childhood, vitamin D deficiency can cause growth retardation and skeletal deformities and may increase the risk of hip fracture later in life. Vitamin D deficiency has been described worldwide.[3] In addition to its important role in skeletal development and calcium homeostasis, it has been suggested that low vitamin D nutritional status may have an impact on extra-skeletal health including increased risk of certain types of malignancy, immunologic dysfunction, diabetes, and cardiovascular disease.[4,5] Vitamin D deficiency in adult scan precipitates or exacerbates osteopenia and osteoporosis, cause osteomalacia and muscle weakness, and increase the risk of fracture.

The discovery that most tissues and cells in the body have a vitamin D receptor and that several possess the enzymatic machinery to convert the primary circulating form of vitamin D, 25-hydroxyvitamin D, to the active form, 1,25-dihydroxyvitamin D, has provided new insights into the function of this vitamin. Of great interest is the role it can play in decreasing the risk of many chronic illnesses, including common cancers, autoimmune diseases, infectious diseases, and cardiovascular disease.[6]

There is widespread prevalence of vitamin D deficiency from new-born to infancy, childhood and adult male and females (non-pregnant, pregnant and lactating).[7] However, there is limited information of the vitamin D status in Nepalese people.

Based on the information in relation to importance of vitamin D, we proposed to see the level of vitamin D among the care seekers individuals attended in this Health

Table-1: Levels of different variables

SN	Variable	Total (%)	
1	**Vitamin D Level(ng/ml)**		Vitamin D status
	< 5	2 (4.3)	36 (Deficiency)
	5-10	6 (13)	
	10-15	20 (43.5)	
	16-20	8 (17.4)	
	21-30	5 (10.9)	5 (Insufficiency)
	31-40	4 (8.7)	5 (sufficient)
	>40	1 (2.2)	
1	**Age group(yrs)**		
	>50	27 (58.7)	
	<50	19 (41.3)	
2	**Occupation**		
	Sedentary work	20 (43.5)	
	Non- Sedentary work	26 (56.5)	
3	**Calcium level**		
	Calcium Deficiency	28 (60.9)	
	Calcium non-deficiency	18 (39.1)	
4	**Phosphorus level**		
	Phosphorus deficiency	0 (0)	
	Phosphorus non-deficiency	46 (100)	
5	**Rh factor (IU/ml)**		
	Reactive (>8)	7 (15.22)	
	Non reactive (<8)	39 (84.78)	
6	Uric acid level		
	Normal range	36 (78.3)	
	High level	10 (21.7)	
7	**TSH level(uIU/ml)**		
	≤5.7	35 (76.1)	
	>5.7	11 (23.9)	

Home Care Nepal, centre that built up to provide Care for Elders. Within the package of services that provided by this centre include mobile blood sample collection who wish to do the tests and lab test done at SRL lab.

OBJECTIVE

Study on vitamin D level among the health care seeker individuals at Health Home Care Centre.

MATERIALS AND METHODS

Different comprehensive package of services are provided for elder people at Health Home Care Nepal. Within this package lab service as Mobile Blood sample collection done based on need from people of any age group and tests done at SRL lab in Kathmandu.

General whole blood test was done by 148 individuals within three months interval (March to May 2012). Based on relevant health problems in relation to vitamin D deficiency as identified by doctor among these individuals, a Vitamin D test was recommended for 50 individuals. These subjects were divided in two groups: Group-1 (<50 years) and Group-2 (> = 50 years). Among these subjects 46 individuals completed the tests and treatment given based on the level of vitamin D and health complains.

Table-2: Vitamin D status and age group

		Age Group		Total
		< 50 yrs.	=> 50 yrs	
Vitamin D	No Deficiency	4	6	10
	Deficiency	15	21	36
Total		19	27	46

P value : 0.92

RESULTS

Lab tests reports obtained from 46 individuals. There were 34 males and 12 females, with a mean age of 53.13 +/- 17.08 years (range 16-80 years). Vitamin D deficiency [VDD, serum 25(OH)D levels < 20 ng/ml) was present in 36 (78.2 %) and vitamin D insufficiency [VDI, serum 25(OH)D levels 20-< 30 ng/ml] in 5 (10.9 %) and sufficiency among 5 remaining individuals (Table-1).

There was no significant difference in prevalence of either VDD or Non Vitamin D deficiency between two age groups (Table-2) and two occupational groups (Table-3). Among 36 vitamin D deficiency individuals, 58% were above 50 yrs and 42% were under 50 yrs.

Serum 25(OH) D levels were negatively correlated with calcium levels (p <0.00001) (Table-4) and haemoglobin level (p 0.03) (Table-5).

High Rh factor found among 15.2 % and high uric acid level found among 21.7 %. There is no significant association of Serum 25(OH) D levels with Uric acid level (p <0.88) (Table-6) and TSH level (p <0.24) (Table-7). All individuals have normal range of phosphorus level and there is no significant relation with vitamin D level.

Table-3: Vitamin D status and occupation

		Occupation Group		Total
		Sedentary	Non-sedentary	
Vitamin D	No Deficiency	5	5	10
	Deficiency	15	21	36
Total		20	26	46

P value :0.63

Table-4: Vitamin D status and calcium

		Calcium		Total
		No Deficiency	Deficiency	
Vitamin D	No Deficiency	9	1	10
	Deficiency	9	27	36
Total		18	28	46

Normal Calcium Level: 8.6 -10.2 mg/dl

P value :0.00

Table-5: Vitamin D status and hemoglobin

		Hemoglobin Level		Total
		Below normal range	Normal range	
Vitamin D	No Deficiency	8	2	10
	Deficiency	15	21	36
Total		23	23	46

Normal hemoglobin Level: 12-15 g/dl

P value :0.03

DISCUSSION

Vitamin D deficiency found more among individuals more than 50 years compare to below age groups. This is consistent with study done in north India.[8] This study showed that 78.2 % of individuals with some health problems had vitamin D deficiency. Study done in Delhi among healthy subjects showed that all groups except one with maximum direct sunlight exposure had subnormal concentrations of vitamin D.[9] In relation to vitamin D and calcium level, calcium deficiency individuals found to be more vitamin D deficiency than among normal calcium level individuals. The study done at Cape town showing relationship between vitamin D, calcium and parathyroid hormone, showed that a subnormal 25(OH) D level was also not always related to hypocalcaemia,[10] however study done among adolescents showed that the higher the serum 1,25$(OH)_2$D concentrations, increased calcium absorption results[11]and other studies also show the positive relation between these two components,[12,13] which is consistent with this study.

In evaluating the association of vitamin D level and hemoglobin level, this study shows that there is association between and lower hemoglobin level and Vitamin D deficiency which is supported by other studies that demonstrates an association of vitamin D deficiency and a greater risk of anemia.[14-16] Future randomized studies are warranted to examine whether vitamin D directly affects erythropoiesis.

This study shows that there is no significant association between Serum 25(OH) D levels and TSH level. However, there are studies which shows that thyroid function depend on level of vitamin D.[17] Also different studies evaluated that hypovitaminosis vitamin D and hypothyroidism is closely associated.

There was fair evidence from this study of an association between circulating 25(OH)D concentrations with some health function indicators like calcium level and hemoglobin level. However, the evidence for an association was inconsistent for other indicators like demographic factors, TSH level, Rh factors and Uric acid level.

The results highlight the need for additional high quality studies in infants, children, women, and diverse racial or ethnic groups. Standard reference preparations are needed so that serum 25(OH)D can be accurately and reliably measured, and validated. Since vitamin D deficiency is now recognized as a pandemic, studies related to this needs to be priotized to increase the awareness among public and health professionals.

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Table-6: Vitamin D status and uric acid

		Uric Acid		Total
		Uric Acid	Deficiency	
Vitamin D	No Deficiency	2	8	10
	Deficiency	8	28	36
Total		10	36	46

Normal Uric Acid Level: 2.4-5.7 mg/dl

P value : 0.88

Table-7: Vitamin D status and TSH

		TSH		Total
		Not in Normal	Normal	
Vitamin D	No Deficiency	1	9	10
	Deficiency	10	26	36
Total		11	35	46

Normal TSH Level:0.2-4.7 IU/ml

P value : 0.24

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