

## A study on vitamin D level among the patients attending in a private chamber in Dhaka city

MA Eva<sup>1</sup>, N Begum<sup>2</sup>, A S M A Kabir<sup>3</sup>, K W Ahmed<sup>4</sup>, M Sharmin<sup>5</sup>, S K Saha<sup>6</sup>, M B Bayazid<sup>7</sup>, S Hasan<sup>8</sup>

### Abstract

**Background :** Vitamin D deficiency is one of the most neglected public health issues all over the world. Near about 1 billion people round the world suffer from vitamin D deficiency. Most of the countries in Asia having high prevalence of vitamin D deficiency.

**Objective :** To find the vitamin D level among the patients attending in a private chamber in Dhaka city

**Methodology :** A cross sectional observation study was carried out in a renowned diagnostic center of Dhaka city from July 2017 to June 2018. A sample of 1523 adult patients aged 18 years and above, presented with generalized body aches and pains selected conveniently for the study. Blood samples were taken and serum vitamin D levels were measured. In this study, vitamin D concentration below 10 ng/ml was considered as vitamin D deficiency, 20–30 ng/ml as insufficiency, and 30–100 ng/ml as vitamin D sufficient. Data were analyzed by using SPSS version 22.

**Result :** Out of 1523 patients 69.5% were women and 30.5% men. Urban and rural distribution was 63.16% and 36.84% respectively. Among the participants vitamin D deficiency was 54%, 35.8% vitamin D insufficient, and only 9.8% had normal level of vitamin D, regarding age specific deficiency highest 71.8% was in 71-80 years age group. Out of 1058 female 39.5% were vitamin D deficient, 45.6% had insufficient vitamin D level. Only 14.9% female were found normal level. Age specific deficiency found highest 63.8% in 61-70 year age group. On the other hand out of 465 male participants, 24% were vitamin D deficient, 34% were insufficient and 42% had normal level vitamin D. Highest deficiency 42.5% found in age group 61-70 years.

**Conclusion :** Considering the study result deficiency was higher among female than male. In female vitamin D deficiency increased after age of 31 year. Vitamin D deficiency found highest in old age and middle age group. Over all age specific deficiency found significantly highest in 71 – 80 years. In both male and female Vitamin D deficiency was found highest above 61 years of age.

DOI: <https://doi.org/10.3329/nimcj.v10i2.45475>

Northern International Medical College Journal Vol. 10 No. 2 January 2019, Page 393-396

### Introduction

Vitamin D deficiency is a global public health concern, even in tropical regions where the risk of deficiency was previously assumed to be low due to continuous vitamin D synthesis stimulated by exposure to sun. Vitamin D is essential for growth and development of the body. It has been estimated that almost one billion people in the world suffer from vitamin D deficiency or insufficiency. Poor vitamin D status, as indicated by low serum concentrations of 25-

hydroxyvitamin D [25(OH)D], has been observed in South Asian populations..<sup>1</sup>

It is our general belief that vitamin D deficiency is prevalent only in western countries, but actual condition is reverse. It is surprising that in South Asia, 80% of the apparently healthy population is deficient in vitamin D (<20 ng/ml) and up to 40% of the population is severely deficient (<9ng/ml). Sachan et al investigated hypovitaminosis D in Lucknow, India and found that 84% of pregnant women had 25(OH)D

<sup>1</sup>Dr. Moushumi Afrin Eva  
Resident Medical Officer (RMO)  
Dept. of Internal Medicine  
Holy Family Medical College  
Dhaka

<sup>2</sup>Dr. Nasreen Begum  
Assistant Professor  
Northern International Medical  
College, Dhaka

<sup>3</sup>Dr. A S M Anawrul Kabir  
Registrar, Dept. of Surgery

<sup>4</sup>Dr. Khondoker Wasee Ahmed  
MO, Dept. of Internal Medicine  
Square Hospital Limited, Dhaka

<sup>5</sup>Dr. Mahbuba Sharmin  
Medical Officer  
Bangabandhu Sheikh Mujib  
Medical University, Dhaka 5

<sup>6</sup>Dr. Sumanta Kumar Saha  
Assistant Professor  
Dept. of Medicine

<sup>7</sup>Dr. Md. Bodroddoza Bayazid  
HMO, Dept of Medicine  
Dhaka Medical College, Dhaka

<sup>8</sup>Shahriar Hasan (Physio Therapist)  
Research Assistant  
BRAC James P Grant School of  
Public Health  
BRAC University, Dhaka

<sup>3,6</sup>  
Holy Family Medical College,  
Dhaka

Correspondence  
Dr. Moushumi Afrin Eva  
Resident Medical Officer (RMO),  
Dept. of Internal Medicine,  
Holy Family Medical College, Dhaka  
Email: [drmoushumi3@gmail.com](mailto:drmoushumi3@gmail.com)

values below 22 ng/mL (the cut-off point in their research.<sup>2</sup> Siddiqui and Rai found that in Northern Pakistan where sunlight was available in abundance, rickets was a common problem in infants and children.<sup>3</sup>

In under develop and developing countries, the major source of vitamin D for human is exposure to sunlight. Bangladesh is a tropical country of south Asia where sunlight is abundant almost year round. Therefore it seems that the prevalence of vitamin D deficiency among the Bangladeshi is less. A study in northern rural Bangladesh found about one-third of infants aged 1--6 months were vitamin D-deficient.<sup>4</sup> A study was carried out among 18-33 years old Bangladeshi women reported low vitamin D levels in 81% women despite being exposed to sun for more than 20 hours per week.<sup>5</sup>

Vitamin D has an important role in calcium homeostasis and bone health since its identification in 1921. Vitamin D deficiency leads to bone diseases like rickets in children and osteomalacia in women. Recently found connections between low vitamin D levels and a wide range of other illnesses such as diabetes, different type of cancers, autoimmune diseases, psychological disorders like depression, cardiovascular diseases, hypertension, lumbago, pre-eclampsia.<sup>6</sup> Following surgery, injury and infection, inadequate vitamin D levels may lead to poor wound healing. Muscle weakness and muscle pain has long been associated with vitamin D deficiency. Patient with vitamin D deficiency may be misdiagnosed with fibromyalgia, degenerative joints disease arthritis, chronic fatigue syndrome and others disease.<sup>7</sup>

Vitamin D is a fat soluble steroid prohormone mainly produced photochemically in the skin from 7 dehydrocholesterol. Vitamin D consists of 2 bioequivalent forms. Vitamin D<sub>2</sub>, also known as ergocalciferol, is obtained from dietary vegetable sources and oral supplements. Vitamin D<sub>3</sub> (D<sub>3</sub>), also known as cholecalciferol, is obtained primarily from skin exposure to ultraviolet B (UVB) radiation in sunlight, ingestion of food sources such as oily fish and fortified foods (milk, juices, margarines, yogurts, cereals, and soy), and oral supplements.<sup>8</sup> Serum 25(OH)D is considered the best functional indicator of vitamin D status reflecting the sum of cutaneous synthesis and oral intake. Serum 25(OH) D level can be determined by direct enzyme-linked immunosorbent assay.

Although it is a research issue all over the world, vitamin D deficiency in Bangladesh yet has not been adequately investigated.

### Methodology

This cross sectional observation study was carried out in a renowned diagnostic center of Dhaka from July 2017 to June 2018. Following non probability convenient sampling technique 1523 patients were selected. Patients were between 11 to 80

years old who attended doctor's chamber with back pain and generalized body ache. Written informed consent was taken during enrollment. This study was approved by the ethical review committee of the concern diagnostic center. Privacy and anonymity of the participants were maintained.

Patients with a major medical illness such as hepatic dysfunction, metabolic disorders such as parathyroid, Diabetes Mellitus, significant thyroid dysfunction, renal diseases, any others metabolic bone disorders, malignancies and patients who were on steroid therapy or any anti-osteoporotic medications like hormone replacement therapy as bisphosphonates were excluded.

### Vitamin D analysis

The serum 25(OH)D is the most reliable marker of vitamin D status. Serum 25 (OH) D levels of all participants was measured and result recorded in data collection sheet. In this study, vitamin D concentration below 10 ng/ml indicates vitamin D deficiency, whereas a concentration of 20--30 ng/ml is considered insufficient, and a 25(OH)D level of 30--100 ng/ml indicate vitamin D sufficient. Data were analyzed by using SPSS version 22.

### Result

A total of 1523 patients were included in the study. The age ranged from 11-80 years. Out of 1523 patients 69.5% (n=1058) were women and 30.5% (n=465) were men. Highest percent of population (19.4% and 10.2%) were belonged to 31 to 40 years and 41 to 50 years age group. 71.5% of the study population belongs to 21-60 years of age group. About (63.16%) of our study population was living in urban location and (36.84 %) were living in rural area. Table – I

**Table - I : Socio-demographic characters of study population**

Age group	Number of Patients	Percentage (%)
11-20	217	14.3 %
21-30	266	17.4%
31-40	296	19.4%
41-50	293	19.4%
51-60	237	15.5%
61-70	118	7.7%
71-80	96	6.3%
<b>Sex</b>		
Male	465	30.5%
Female	1058	69.5%
<b>Residence</b>		
Urban	962	63.16%
Rural	561	36.84%

Out of the 1523 study subjects, 827(54%) were Vitamin D deficient, 546(35.8%) were vitamin D insufficient, and only 150 (9.8%) patients had normal level of vitamin D. (Table II)

**Table: II : Vitamin D status among the study population(n=1523)**

Vitamin D level (ng/ml)	Vitamin D status	Frequency (n)	Percent (%)
> 30	Normal	150	9.9%
20- 30	Insufficient	546	35.8%
< 10	deficient	827	54.3%

Highest percent of participants (71.9%) with vitamin D deficiency was in 71-80 years age group. Lowest percent (33.4%) of the participants belonged to 21-30years of age (Table III).

**Table - III : Serum vitamin D level in different age groups of study population (n=1523)**

Age group	Number of Patients		Vitamin D status		
	Patients	Deficient n(%)	Insufficient n(%)	Sufficient n(%)	
10-20	217	81 (37.4%)	73(33.6%)	63(29.0%)	
21-30	266	89(33.4%)	152(57.3%)	25(9.3%)	
31-40	296	199(67.3%)	87(29.4%)	10(3.3%)	
41-50	293	166(56.6%)	102(34.8%)	25(8.6%)	
51-60	237	144(60.7%)	78(32.9%)	15(6.4%)	
61-70	118	79(66.9%)	34(28.8%)	5(4.3%)	
71-80	96	69(71.9%)	20(20.8%)	7(7.3%)	

Out of 1058 female, 418 (39.5%) were vitamin D deficient and 482 (45.6%) had insufficient vitamin D level. Only 158 (14.9%) female were found normal level of vitamin D. Among female participant age 61-70 year had the highest percentage 60(63.8%) of vitamin D deficiency and 118 (52.4%) was 31-40 age group (Table IV).

**Table -IV : Vitamin D status of female study population (n=1058)**

Age group	Number of Patients		Vitamin D status		
	Patients	Deficient n(%)	Insufficient n(%)	Sufficient n(%)	
10-20	48(4.5%)	14(29.2%)	15(31.3%)	19(39.5%)	
21-30	176(16.6%)	42(23.8%)	80(45.5%)	54(30.7%)	
31-40	225(21.26%)	118(52.4%)	82(36.4%)	25(11.2%)	
41-50	264(24.9%)	101(38.3%)	141(53.4%)	22(8.3%)	
51-60	182(17.2%)	64(35.2%)	100(54.9%)	18(9.9%)	
61-70	94(8.8%)	60(63.8%)	25(26.6%)	9(9.6%)	
71-80	69(6.5%)	19(27.5%)	39(56.6%)	11(15.9%)	
<b>Total</b>	<b>1058(100%)</b>	<b>418 (39.5%)</b>	<b>482 (45.6%)</b>	<b>158 (14.9%)</b>	

On the other hand out of 465 male participants, 112 (24%) were vitamin D deficient, 158(34%) were insufficient and 195(42%) had normal level vitamin D. Highest deficiency 48(42.3%) found in age group 61-70 years (Table V)

**Table -V : Vitamin D status in male study population (n=465)**

Age group	Number of Patients		Vitamin D status		
	Patients	Deficient n(%)	Insufficient n(%)	Sufficient n(%)	
10-20	15(3.2%)	2(13.3%)	5(33.3%)	8(53.4%)	
21-30	78(16.17)	16(20.5%)	21(26.9%)	41(52.6%)	
31-40	49(10.5%)	9(18.1%)	11(22.7%)	29(59.2%)	
41-50	84(18.0%)	18(21.4%)	39(46.4%)	27(32.2%)	
51-60	96(20.6%)	14(14.5%)	26(27.0%)	56(58.5%)	
61-70	112(24.0%)	48(42.3%)	36(32.7%)	28(25.0%)	
71-80	31(6.6%)	5(16.1%)	20(64.6%)	6(19.3%)	
<b>Total</b>	<b>465(100%)</b>	<b>112 (24%)</b>	<b>158(34%)</b>	<b>195(42%)</b>	

## Discussion

This study was conducted to assess Vitamin D level among patients attending doctor's chamber in a private clinic in Dhaka. Among the respondents 54.3% were found deficient in vitamin D and 35.8% were insufficient only 9.9% were with normal levels of vitamin D. This result was nearly similar with a study conducted by Riaz et al on 4830 randomly selected citizens of Pakistan found that 53.5% Vitamin D had deficient levels, 31.2% were found with insufficient levels and only 15.3% showed normal serum level.<sup>9</sup> In our study deficiency of vitamin D level was found highest (71.9%) in age group 71-80 years and insufficient (57.3%) was found in 21-30 years age group. Different picture was found in a Bangladeshi study done by Hossain HT et al; Highest percentage (37.5%) of severely deficient vitamin D level (<10 ng/ml) was found in 31- 50 years of age.<sup>10</sup>

In our study among female vitamin D sufficient level was highest (39.2%) in younger age group 11 – 20 years next sufficient level (30.8%) was in 21 – 30 years. At these ages persons are active remain outside and exposed to sun more. After 31 years of age vitamin D level decreased and deficiency found highest (63.8%) in old age group 61 – 70 years and (52.4%) middle age group 31 – 40 years. Surekha Bhat M et al in their study found highest deficiency (87.76%) among age group 20-30 years and (79.84%) in age group 30-40 years.<sup>11</sup> In this study among male respondents highest percentage of deficient vitamin D level (42.3%) found in 61 – 70 years of age and insufficient (64.6%) in age group 71-80 years. A study done by Surekha Bhat M et al showed opposite picture deficiency was highest (70.45%) among 20-30 years and insufficiency (22.22%) found in age group 50-60 years which was reverse to our study result.<sup>12</sup> It was also revealed from result that sufficient vitamin D level was found highest (59.2%) in 31 – 40 years age group next highest (58.5%) and (53.4%) were found in age groups 51 – 60 years and 10 – 20 years respectively.

In our country male are more exposed to outdoor sun. The current study revealed vitamin D status of male found as deficient, insufficient and sufficient were (24%), (34%) and

(42%) respectively on the other hand female vitamin D status found deficient, insufficient and sufficient were (39.5%), (45.6%) and (14.9%) respectively. Therefore in this study among male vitamin D status were better than females. A study in Nepal elucidated females were significantly more deficient of vitamin D as compared to male (70.08% vs. 75.37%) ( $p=0.016$ ). This was due to socio economic status as most of male were exposed to external environment that is working outside at sun for long time.<sup>13</sup> Study by Roomi et al. in India also found similar outcome, that was female were significantly more deficient than male.<sup>13</sup>

### Conclusion

In conclusion, the prevalence of vitamin D deficiency as well as insufficiency in the present study was higher among female than male. Over all age specific vitamin D deficiency was significantly highest in 71 – 80 years. The highest deficiency and insufficiency in males in the old aged group (61 – 70) years and 71-80 years. In female vitamin D deficiency found highest in old age group and middle age group. It was also observed that vitamin D deficiency increased after age of 31 year.

### Acknowledgement

The authors would like to express their sincere gratitude to Dr. Nasreen Begum for her sincere cooperation. Also to all participants and Padma diagnostic center for providing support and also Prof. Dr. Kaniz Moula, Consultant, Department of Internal Medicine, United Hospital and Padma diagnostic center, Dhaka for her valuable contribution.

### References

1. HAM Nazmul Ahasan, Aparna Das. Vitamin D Deficiency in South Asian Populations: A Serious Emerging Problem. Editorial, Journal of Enam Medical College; Vol 3 No 2: July 2013
2. Sachan A, Gupta R, Das V, Agarwal A, Pradeep K, Awasthi PK et al. High prevalence of vitamin D deficiency among pregnant women and their newborns in northern India. *Am J Clin Nutr* 2005; 81: 1060--1064.
3. Siddiqui TS, Rai MI. Presentation and predisposing factors of nutritional rickets in children of Hazara division. *J Ayub Med Coll* 2005; 17(3): 29--32.
4. Roth DE, Shah MR, Black RE, Baqui AH. Vitamin D status of infants in northeastern rural Bangladesh: preliminary observations and a review of potential determinants. *J Health Popul Nutr*. 2010 October; 28(5): 458--469.
5. Islam MZ, shamim AA Kemi, V Navanlinna A. Akhtruzzamen M Lakesrne M, et. al. Vitamin D deficiency and low bone status in adult female garment factory worker in Bangladesh. *Brit J natu*. 2008;99(6)13322-1329
6. Kuryowicz A, Bednarczuk T, Nauman J. The influence of vitamin D deficiency on cancers and autoimmune diseases development. *Endokrynol Pol* 2007;58(2):140-523,
7. Plotnikoff GA, Quigley JM prevalence of severe hypovitaminosis D in patients with persistent, nonspecific musculoskeletal pain: *Mayo Clin Proc* 2006; 78:1463-70.
8. Pliz S, Vitamin D status and arterial hypertension: A systematic review. *Nat. Rev. cardiol*. 2009;6:621-630
9. Riaz H, Finlayson AE, Bashir S, Hussain S, Mahmood S, Malik F, et al. Prevalence of Vitamin D deficiency in Pakistan; implications for the future. *Expert Rev Clin Pharmacol* 2016;9(2):329-38.
10. Hossain HT, Islam QT, Khandaker MAK, Ahasan HN Study of Serum Vitamin D Level in Different Socio-Demographic Population- A Pilot Study; *J Medicine* 2018, Vol. 19, No. 1 22-29
11. Surekha Bhat M, Lasrado I, Rajeshwari SG, Gururaja A, Prabhu K, et al. (2017) Prevailing Serum Vitamin D Levels among Individuals in South Karnataka. *J Bioanal Biomed* 9:184-188. doi: 10.4172/1948-593X.1000178
12. Surekha Bhat M, Lasrado I, Rajeshwari SG, Gururaja A, Prabhu K, et al. (2017) Prevailing Serum Vitamin D Levels among Individuals in South Karnataka. *J Bioanal Biomed* 9:184-188. doi: 10.4172/1948-593X.1000178.
13. Bhatta MP et al .Prevalence of vitamin D deficiency among adult population of Western Region of Nepal *International Journal of Medicine Biomedical Sciences*. 2016; 1(2):7-12
14. Roomi MA, Farooq A, Ullah E, Lone KP. Hypovitaminosis D and its association with lifestyle factors. *Pakistan journal of medical sciences*. 2015;31(5):1236-40.