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Evaluation of Risk Factors Associated with Vitamin D Deficiency in a Tertiary Medical College Hospital of Bangladesh

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Abstract **Original Research Article**

Objective: In this study our main goal is to evaluate the risk factors associated with vitamin D deficiency in Dhaka Medical College Hospital. ***Method:*** This cross-sectional study was carried out at Dhaka Medical College Hospital from January 2018 to Jun 2019. A total of 100 patients attending at OPD of various specialties with symptoms unrelated to gross vitamin D deficiency were included in the study. ***Results:*** During the study, majority of the cases were belonging to >24 years age group and 60% were female. 50% were service holder followed by 50% cases spent 3-6 hours in outdoor, 50% cases covered their body 60–80%.45% had vitamin D insufficient level and 33% had vitamin D deficiency level. Individuals who had a serum deficiency of 25-OHD had significantly lower calcium levels (9.25 ± 0.49, p ¼ 0.02), and those with insufficiency had significantly higher hemoglobin (14.3 [13.2e15.2] p < 0.001). There was a strong correlation found between gender; 0.03, educational level; 0.02 and number of hours spent outdoors; 0.01 with Vitamin D deficiencies. ***Conclusion:*** From our study we can say that, factors like, less outdoor activities, obesity or covering whole body, which could be responsible for more hypovitaminosis in case of female was not noticed. But it was very much clear that >24 years age group was the most vulnerable with highest level of hypovitaminosis-D. Some of these strategies include designing and implementing national programs for preventing and combating vitamin D deficiency, promoting healthy lifestyles and physical activity among the general public, as well as using vitamin supplements as a simple and cost-effective method.

Keywords: Vitamin D, hypovitaminosis-D, Vitamin D deficiency.

INTRODUCTION

Vitamin D is a key regulator of calcium and phosphorous metabolism" PTH, serum calcium level, intestinal absorption and renal function control vitamin D levels [1]. Skin synthesizes vitamin D upon exposure to sunshine producing UV radiation in the range of 290-315nm [2]. A very little amount of vitamin D is also found in foods such as fatty fish (tuna, salmon and mackerel), liver of cattle, cheese, egg yolks and meals fortified with vitamin D. Vitamin D is metabolized to 25-hydroxyvitamin D3 in the liver [3].

From one year to fifty years of age, men and women should consume 200-600 IU/day of vitamin D. In the case of persons between 51 and 70 years of age, the need climbs to 800 IU/day. For babies, toddlers and adolescents, the American Academy of Pediatrics has raised the recommended daily dosage to 400 IU/day13. Around a billion individuals suffer from vitamin D deficiency. Deficiency is defined as less than 20nmol/L of vitamin D, whereas insufficiency is defined as less than 30nmol/L (1nmol/l = 0.4ng/m) [4, 5].

In this study our main goal is to evaluate the risk factors associated with Vitamin D deficiency of adults in Dhaka Medical College Hospital.

OBJECTIVE

- To assess the risk factors associated with Vitamin D deficiency.

METHODOLOGY

Types of study

- It was a cross sectional type study.

Place and period of the study

- The study place was carried out at Dhaka Medical College Hospital, Dhaka, Bangladesh. Where data were collected from January 2018 to Jun 2019.

Study population

- A total of 100 patients attending at OPD of various specialties with symptoms unrelated to gross vitamin D deficiency were included in the study.

Data analysis

- All collected data were coding and input in SPSS-25 for further analysis. Both descriptive and inferential statistics done. Descriptive statistics included frequency distribution, percent, mean, standard deviation; graph, tables, figures and inferential statistics.

RESULTS

In table-1 shows the age distribution of the study group where the majority of the group belong to >24 years age group, 43%. The following table is given below in detail:

Table-1: Age distribution of the study group

Age	%
<20 years	25
20-24 years	32
>24 years	43

In figure-1 shows gender distribution where 60% were female and 40% male. The following figure is given below in detail:

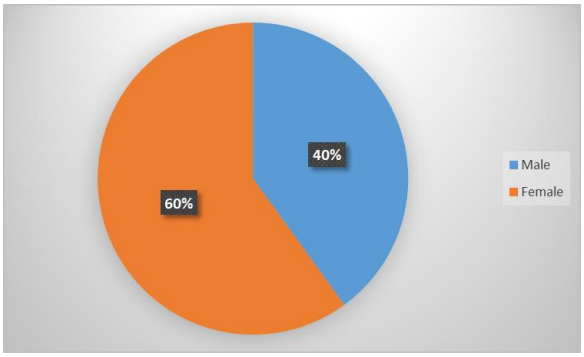

Fig-1: Gender distribution

In table-2 shows demographic status of the study group where 50% were service holder followed by 50% cases spent 3-6 hours in outdoor, 50% cases covered their body 60–80%. The following table is given below in detail:

Table-2: Demographic status of the study group

Education status	%
Primary	15%
Secondary	25%
Graduation	55%
Marital status	**%**
Married	80%
Unmarried	20%
Occupational status	**%**
Service holder	50%
Business man	15%
Housewife	25%
Other	10%
Number of hours spent outdoors	**%**
<1 hour	10%
<3 hour	15%
3-6 hours	50%
6-10 hours	25%
% of body covered	**%**
>80%	40%
60–80%	50%
<60%	10%

In figure-2 shows vitamin D status of the study group where 45% had vitamin D insufficient level and 33% had vitamin D deficiency level. The following figure is given below in detail:

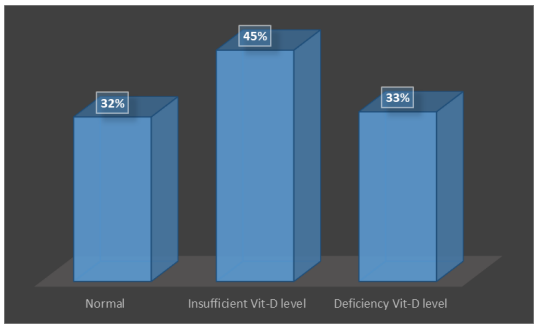

Fig-2: Vitamin D status of the study group

In table-3 shows correlation of demographic status according vitamin D deficiency where there was a strong correlation found between gender; 0.03, educational level; 0.02 and number of hours spent outdoors;0.01 with Vitamin D deficiencies. The following table is given below in detail:

Table-3: Correlation of demographic status according vitamin D deficiency

Demographic status	P value
Age group (years)	0.05
Gender	0.03
Educational level	0.02
Marital status	0.47
Number of hours spent outdoors	0.01
% of body covered	0.60

In table-4 shows descriptive statistics of each variable with deficiency where individuals who had a serum deficiency of 25-OHD had significantly lower calcium levels (9.25 ± 0.49, p ¼ 0.02), and those with insufficiency had significantly higher hemoglobin (14.3 [13.2e15.2] p < 0.001). The following table is given below in detail:

Table-4: Descriptive statistics of each variable with deficiency

Variable	Serum 25-OHD deficiency (<30 nmol/L)	P value
BMI (kg/m2)	28.90 ± 5.63y	0.58
SBP (mmHg)	120.0 [110.0-135.0]	0.97
DBP (mmHg)	80.0 [70.0-80.0]	0.48
Hemoglobin (g/dl)	14.3 [13.2-15.2]	<0.001
Platelets (103/ml)	238.6 ± 59.7	0.86
Creatinine (mg/dl)	1.0 [0.9-1.1]	0.006
Calcium (mg/dl)	9.25 ± 0.46	0.02
Phosphorus (mg/dl)	4.12 ± 0.55	0.19
Iron (m/dl)	87.95 ± 32.11	0.87

DISCUSSION

Recent studies have highlighted the critical role played by vitamin D in bone metabolism and extra-skeletal function, such as immune regulation, cancer prevention, and hypertension. The major goal followed in this study was to determine the extent to which vitamin D deficiency is prevalent among adults in one study. The results showed that the level of vitamin D (25-OHD) deficiency was common where 70.8% of subjects in the study had a 25-OHD level below average (24.2% had a deficiency, and 46.6% had insufficiency). It seems that non-exposure to sunlight, non-intake of vitamin D supplements, or inadequate intake of vitamin D in the diet are among the contributory factors in this deficiency [6]. Where as in our study we found 45% had vitamin D insufficient level and 33% had vitamin D deficiency level, which was quite similar to other studies [5, 6].

Another study concluded that the mean 25-OHD serum level was 55.4 ± 23.4 nmol/L in the total healthy population of northern Portugal, while 48% of the population had vitamin D insufficiency (less than 50 nmol/L), which raised to 74% in the winter time [7].

Another report also suggested an outbreak of vitamin D deficiency among the adult population in Germany. In a study of the Canadian adult population, concluded that vitamin D levels were less than 75 nmol/L, especially in obese and non-white people and that it was commonplace in spring and winter. Vitamin D consumption via diet and supplement and weight control within a healthy range are the key modifiers affecting the level of vitamin D [8]. Another study also examined the levels of vitamin D in an Australian population and concluded that vitamin D deficiency is common in South Australia, affecting nearly a quarter of the population [9].

They enumerated the activity level, obesity, and season as factors influencing vitamin D status. Another study also reported a 45% rate of 25-OHD deficiency [10]. All of these reports are consistent with the results of our study. The results of the current study indicate a deficiency of 25-OHD in both genders, which can be attributed to the lifestyle of individuals.

CONCLUSION

Due to vitamin D's importance in the body and the many factors that influence its level, not to mention the illnesses and problems that follow from its shortage, vitamin D insufficiency should certainly be recognized as one of the most important public health concerns. Factors like, less outdoor activities, obesity or covering whole body, which could be responsible for more hypovitaminosis in case of female, was not noticed. But it was very much clear that >24 years age group was the most vulnerable with highest level of hypovitaminosis-D. Outlined below are some more ways to enhance the public's well-being. Some of these strategies include designing and implementing national programs for preventing and combating vitamin D deficiency, promoting healthy lifestyles and physical activity among the general public, as well as using vitamin supplements as a simple and cost-effective method.

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