



# Relationship of Egg and Milk with Hypovitaminosis D in Females of Nalanda district, Bihar, India.

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## Abstract

Hypovitaminosis D occurrence has became a common pathology even in suburban population but still it has not been addressed promptly, the manifold increase in metabolic disorders and other ailments attracted our attention to ascertain the cause of low level of circulating 25(OH)D in serum. Exposure to sunlight is one of the richest sources to synthesize vitamin D easily but life style and cultural dressing style may hamper the synthesis. we decided to explore the impact of consumption of egg and milk on the level of 25-hydroxyvitamin D in females of Nalanda district. The subjects of hypovitaminosis D from leading medical practitioners were interviewed by giving them questionnaire to evaluate their food habit especially about intake of egg, milk or both. Group I was created by egg taking subjects, group II was formed by milk taking subjects while group III was formed by both egg and milk consuming subjects. This particular area has one of the largest dairy plant- Nalanda Dairy having capacity to produce 0.4 million litres of fortified milk everyday. Innumerable small dairy or khatals are ubiquitous so as the poultry farms as a result the availability is not a matter of concern for the people. This study revealed that those taking both egg and milk (group III) were less prone to hypovitaminosis D as compared with group-II (milk consuming) and group-I (egg consuming).out of 210 subjects only 27n found in group-III whereas 117n were found in group II followed by group-I which had 66n participants. Egg and fortified milk are good sources of vitamin D, although fatty fishes like - salmon, swordfish, tuna fish, cod liver oil and mushroom are rich sources but considerable amount is available in beef liver, egg yolk, dairy fortified milk. Present study was an attempt to find out the impact of egg and milk on circulating 25-hydroxyvitamin D, further studies with larger sample size would provide a better understanding regarding foods and vitamin D level.

**Keywords:** 7-dehydrocholesterol, 25-hydroxyvitamin D, Egg, Fortified Milk, Hydroxylation,

## Introduction

Hypovitaminosis D and its impact on health has been an established fact. The sunshine vitamin is indispensable element for almost all physiological activities as having a major role in calcium and phosphorous absorption and thus regulating the various bodily functions. Low level of serum 25 hydroxyvitamin D is now being considered as the key factor that brings many abnormalities in metabolism. The implication of its deficiency has been linked with rickets and osteoporosis but many other ailments like- autoimmune disease, cardiovascular complications, diabetes and cancer are now being linked. Evidence has emerged that vitamin D can no longer be thought of as nutrient necessary for the

prevention of rickets and osteoporosis, rather it should be considered essential micronutrient for maintaining overall health and well-being. The major source of vitamin D is exposure to sunlight nevertheless some vitamin D rich foods also play minor role in maintaining the optimum level of 25 hydroxy vitamin D in serum. Vitamin D is termed as prohormone which act through its receptors present on almost all cells of body. Its synthesis takes place under the skin where 7-dehydrocholesterol gets converted into previtamin D3 by ultraviolet irradiation. Further two hydroxylations take place in liver and kidney (other tissues also) respectively. The first hydroxylation occurs in the liver to form 25 hydroxyvitamin D, moreover known as 25(OH)D or calcidiol –the major circulating form of vitamin D. The second hydroxylation occurs mainly in kidney and other extrarenal tissues that produces 1,25(OH)2D- capable of regulating wide variety of genes by exerting its endocrine function through vitamin D receptors (VDR).

The aim of this study is to find out relationship between hypovitaminosis D and intake of egg as well as milk in females of Nalanda district. Although the major causes of its deficiency of 25(OH)D are attributed to less exposure to sunlight, dressing style, use of sunscreen, skin pigmentation and obesity. Rich dietary sources of vitamin D are limited to fatty fishes (salmon, swordfish, tuna fish), cod liver oil and mushroom but considerable amount is available in beef liver, egg yolk, dairy fortified milk etc. It is imperative to obtain ample amount of vitamin D either from Sunlight or from dietary sources. The term Vitamin D includes two compounds- vitamin D3 (Cholecalciferol) or vitamin D2 (ergocalciferol), Cholecalciferol is synthesized during exposure to sunlight and non vegetarian diets whereas Ergocalciferol is found in vegetal souces.

Nalanda district and its headquarter Bihar Sharif is having suburban population where dairy and poultry products are easily available as Nalanda diary plant one of the largest in northern India having capacity to process and produce 4 Lacs litres of milk every day and is situated in Biharsharif and innumerable small scale dairy and poultry farms are mushrooming. The economy of this particular part of land is highly dependent on farming and agriculture activities.

## Materials and Methods

We conducted this study at clinical level of different prominent physicians to ascertain the food intake habit especially milk and egg of hypovitaminosis D patients. The patients were kept in two different groups, set I having patients whose vitamin D level were between 1-9 ng/ml in serum termed them severely vitamin D deficient and set II patients with less than 20 ng/ml but more than 10 ng/ml and termed them vitamin D deficient. We took feedback from hypovitaminosis D patients through questionnaire from three prominent medical practitioners of Nalanda district – namely Dr. Shyam Narain Prasad, Dr. Tanvir Ahmad and Dr. Sujit Kumar. Total 234 subjects were contacted out of which 24 subjects were excluded either due to non co-operation or fulfilling exclusion criteria. So 210 subjects were interviewed face to face and obtained the required feedback regarding their milk and egg taking habit.

### **Group I ( Egg taking Group)**

It included female subjects who were reported taking egg on dailybasis, thrice in a week or twice in a week.

### **Group II ( Milk Taking group)**

It included female subjects who were reported taking milk on daily basis, thrice in a week or twice in a week

### **Group III ( Egg and Milk taking Group)**

It included female subjects who were reported taking both milk and egg on daily basis, thrice in a week or twice in a week

## Inclusion Criteria

Female subjects having hypovitaminosis D and newly diagnosed age group from 15- 40 years were included in this study. All the participants who were taking milk or egg or both milk and egg

## Exclusion Criteria

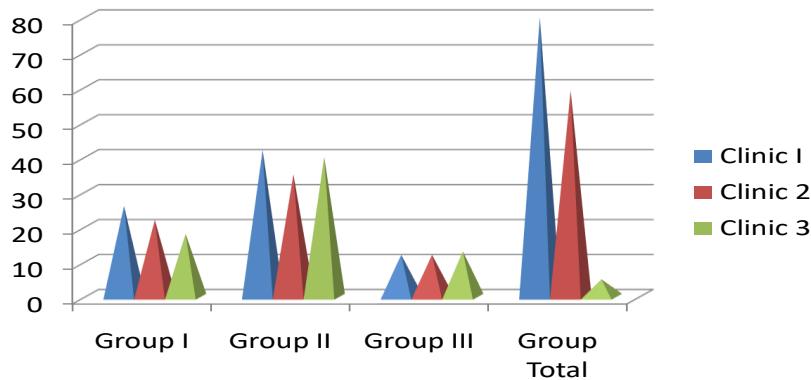
Patients who were taking vitamin D tablets/ capsules or injections along with calcium supplements or those patients who had consumed vitamin D within last 3-4 months. We had also excluded those patients who were suffering from kidney and liver disorders.

## Result

This study examined the level of Vitamin D in female subjects of Nalanda district suffering from hypovitaminosis D. We mainly focused in young individuals taking milk and egg in their diet to ascertain the impact of these two food items. The outcome of the study covertly indicated that those subjects who were taking both milk and egg Group III (12.85%) had less severe hypovitaminosis D as compared with those who were taking only egg Group I (31.42%) had reported moderate deficiency whereas group II (55.71%) were reported taking only milk had most severe Hypovitaminosis D and the number of subjects were also on higher side. The occurrence of Hypovitaminosis D in three groups were showing remarkable disparity with each other and signifying that the constituents of egg and milk impart favourable effect on level of vitamin D in serum while consuming milk alone showed higher deficiency whereas consumption of egg alone had less number of subjects who showed decrease level of vitamin D (Table 1)

Clinics	Dr. Shyam Narain Prasad	Dr. Tanvir Ahmad	Dr. Sujit Kumar	Total	Percentage
Group I	26 (39.39%)	22 (33.33%)	18 (27.27%)	66	31.42%
Group II	42 (35.89%)	35 (29.91)	40 (34.18%)	117	55.71%
Group III	12 (44.44%)	02 (7.4%)	13 (48.14%)	27	12.85%
No. of Subjects	80 (38.09%)	59 (28.09%)	71 (33.80%)	210	100

Table 1: Showing number of patients and their percentage taking milk or egg or both



Graph 1: Showing number patients suffering from Hypovitaminosis D in all three Clinics

Clinics	(set I) Serun Vit D level 1-9 ng/ml No. of Subject (n)	(set II) Serum Vit D level 10-20 ng/ml No. of Subjects	Total
1	31( 38.75%)	49 (61.25%)	80
2	38 (64.40%)	21 (35.59%)	59
3	11 (15.49%)	60 (84.50%)	71
Mean Value	<b>39.54%</b>	<b>60.44 %</b>	<b>70</b>

Table 2 : showing number and percentage of patients suffering from hypovitaminosis D in all three clinics.

Hypovitaminosis D subjects from all three clinics show quite different pattern with different groups i.e- I,II & III. 38.75% subjects of group I showed that they have severe hypovitaminosis D and serum vitamin D level were between 1-9 ng/ml whereas 61.25% subjects of same group have serum vitamin D level between 10-20 ng/ml. In group II 64.40% subjects having serum vitamin D level between 1-9 ng/ml whereas 35.59 % subjects showed vitamin level between 10-20 ng/ml in serum. In group III only 15.49% subjects showed 1-9 ng /ml whereas 84.50% subjects have serum vitamin D level between 10-20 ng/ml. The measured value of vitamin D level evidently indicates that group III subjects have less severe hypovitaminosis D and least number of subjects as compared to other two groups .Among all the groups the subjects of group II have more severe hypovitaminosis D and also highest number of patients reported in this group.

Foods	Daily	Twice in a Week	Thrice in a week
subjects reported taking Egg	06 n	45 n	15 n
subjects reported taking Milk	47 n	32 n	40 n
subjects reported taking both	13 n	9 n	05 n

Table 3 : Showing food habits of total subjects and frequency of food like daily, twice in a week and thrice in a week

Group	Fortified Milk	Unfortified Milk
Subjects of Group II	21(17.94%)	96 (82.05%)
Subjects of Group III	19 (70.37%)	08 (29.62%)

Table 4: Showing number and percentage of subjects consuming fortified and unfortified milk

## Discussion

The outcome of this study provide a glimpse of hope to the large number of individuals who were suffering with hypovitaminosis D. The Recommended Dietary Allowance for adults 18 years and older is 600 IU (15 mcg) daily. Our bodies produce vitamin D when exposed to sunlight. There are a few reasons why it's hard to get enough vitamin D this way. To reduce the risk of skin cancer, it's smart to cover up, wear sunscreen, and avoid being outside during peak sun hours. And depending on the indoor and outdoor activities, it may just not be possible to have enough sun exposure. That's why getting vitamin D from food or supplements is second best choice. We attempted to evaluate the outcome of consuming egg, milk or both on level of vitamin D. Food rich in cholesterol and vitamin D like egg is a good source to compensate the depleting level of one of the most important vitamin which actually behaves like hormone and every cell of our body have its receptors. And on the other hand milk fortified with vitamin D is another source to combat vitamin D deficiency .One egg contains 37 IU of vitamin D equivalent to 0.925 mcg approximately 10% of daily requirement. Processed dairy milk are fortified with 100 IU of vitamin D, but most of the subjects (82.05% of group II) participated in study were consuming milk which was not fortified as the small dairy or khatal supplying unfortified milk.

## Conclusion

Hypovitaminosis D and its harmful affect on health is no longer a matter of discussion but its prevalence in suburban population is quite disturbing and may become a leading cause of various metabolic disorders. Increasing the amount of vitamin D in the body can prevent or help treat a notable number of ailments. Apart from exposure to sunlight egg and fortified milk supplements may prove to be a good alternative to make up the shortfall in the vitamin D level. The group III who had both egg and milk reported lesser number of individuals only 27 n out of 210 n , while group II who had only milk reported highest number of individuals(117 n) followed by group I (66 n) who were taking only egg. The constituents of egg and fortified milk might be providing the much looked-for vitamin for replenishing some part of our dietary requirement of vitamin D.

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