

Assessment of Prevalence of Vitamin D Deficiency in Pregnant Females in Tertiary Care Hospital in Kashmir

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Abstract

Background: Vitamin D deficiency is prevalent in India, a finding that is unexpected in a tropical country with abundant sunshine. Vitamin D deficiency during pregnancy has important implications for the newborn and infant. There are few data from India about the prevalence of vitamin D deficiency in pregnancy and in the newborn.

Objective: Our aim was to determine the prevalence of Vitamin D deficiency in pregnancy by measuring their serum vitamin D₃ levels.

Study design: Serum levels of Vitamin D were assessed in 50 pregnant females from March to September 2017.

Results: Our study showed that 68% of patients were having Vit D deficiency with 8% having levels below 10ng/ml, 26% had levels between 11-20 ng/ml and 34% between 21-30ng/ml. 32% patients had adequate Vit D levels.

Conclusion: There was significant percentage of Vit D deficiency in pregnant females.

Key Words: Vitamin D, Deficiency, Prevalence, Pregnancy

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I. Introduction

Vitamin D is a fat-soluble vitamin that is naturally present in some foods, added to others, and available as a dietary supplement. It is also produced endogenously when ultraviolet rays from sunlight strike the skin and trigger synthesis of vitamin D. Vitamin D obtained from sun exposure, food, and supplements is biologically inert and it must undergo two hydroxylations in the body for activation.

There are two forms of vitamin D. Vitamin D₃ (cholecalciferol) produced in skin and vitamin D₂ (ergocalciferol) produced by yeast and mushrooms. The biologically active form of vitamin D is 1, 25 (OH) 2D. This requires hydroxylation of vitamin D in the liver to 25(OH) D (25-hydroxyvitamin D), which then undergoes renal hydroxylation to form 1, 25 (OH) 2D. 25(OH) D is the major form of circulating vitamin D and serum 25(OH) D concentrations generally reflect nutritional status. Production of 1, 25 (OH) 2D in the kidney is regulated by plasma parathyroid hormone (PTH), serum calcium and phosphate levels.

Vitamin D deficiency is common across the globe. Large epidemiological studies reveal quite high prevalence of vitamin D deficiency in women, including antenatal and lactating mothers.^{1,2,3}

Vitamin D requirements are increased in pregnancy, as physiologically higher 1, 25-dehydroxy vitamin D levels seen in the second and third trimesters. The physiological rise in the active metabolite, the enhanced intestinal calcium absorption, and enhanced fetal requirement of calcium (250 mg/day in the third trimester) all point to the importance of vitamin D physiology in pregnancy.⁴

The musculoskeletal manifestations of vitamin D deficiency include Rickets and osteomalacia which have been linked with the condition for nearly a century now. Nonskeletal associations of vitamin D deficiency are now being unraveled. Various authors associate low vitamin D levels and various elements of the metabolic syndrome. Yet others describe Vit D as the immunomodulatory, anti-infective, anabolic and anti-tumoral potential.

Maternal secondary hyperparathyroidism, osteomalacia, neonatal hypocalcemia, tetany and delayed ossification of the cranial bones and cranial fontanelles has been reported by various authors, and reviewed in detail by others.⁴

The relationship between low vitamin D and adverse maternal outcomes such as pre-eclampsia,⁵ gestational diabetes mellitus,⁶ recurrent pregnancy loss,⁷ preterm delivery,⁸ primary Caesarian section,⁹ and postpartum depression¹⁰ has been documented in recent few years.

Holles *et al.* suggest that pregnant women should have a circulating vitamin D >40 ng/ml, irrespective of how it is achieved.¹¹

The Institute of Medicine recommendations suggest a normal level of 20 ng/ml in pregnancy, while the Endocrine Society recommends 30 ng/ml or more.^{12,13}

The recommended daily intake of vitamin D ranges from 400 to 600 IU (by the IOM),¹⁴ 400 IU (by the National Institute for Health and Clinical Excellence, United Kingdom),¹⁵ and to 1500-2000 IU (by the Endocrine Society),¹⁶ and 2000 IU (by the Canadian Society).¹⁷

Objectives:

To assess the prevalence of vitamin D deficiency in pregnant females.

II. Methodology

This study was conducted in the Department of Obstetrics and gynecology GMC Srinagar from Mar 2017-Sep 2017. A random sample of 50 patients was taken in the study. A detailed history and examination was done. Questions regarding various risk factors were asked like smoking, duration of sun exposure and use of multivitamins. Samples for Vit D were collected and sent to lab. Serum vitamin D levels were determined using liquid chromatography coupled to tandem mass spectrometry. A value of less than 30ng/ml was taken as vit D deficiency status. Data was analysed using Spss 20 version.

III. Results

Table 1: Demographic profile

Maternal age(Yrs)	Number	Percentage
21-25	17	34%
26-30	26	52%
>30	7	14%
Gravidity		
G1-G2	26	52%
G3-G4	20	40%
>G4	4	8%
BMI		
<19	6	12%
19-25	23	46%
26-30	16	32%
>30	5	10%
Mean G Age at testing(Wks)	25±5.3(Wks)	

Table 1 shows various demographic variables. Most of the patients were in age group 26-30(26) followed by 21-25 age group (17).

26 of patients were Gravida 1 or 2 and 20 were Gravida 3-4. The mean gestational age at time of testing was 25±5.3 wks.

Table 2: Serum vitamin D levels

Serum Vit D level	Number	Percentage
<10ng/ml	4	8%
11-20 ng/ml	13	26%
21-30 ng/ml	17	34%
31-40 ng/ml	11	22%
>40 ng/ml	5	10%

As is obvious from table 2, 68% of patients were having vit D deficiency (Level <30ng/ml) and 32% patients were having adequate vit D levels.

Table 3: Risk factors

	Yes	Percentage
No Multivitamin use	38	76%
Less Daily sun exposure(less than half an hour)	26	52%
Smoking	9%	18%

Table 3 shows various risk factors. 18% of the patients were smokers. 24% patients were taking multivitamins regularly, the dose of which was not known. 52% patients had average daily sun exposure of less than half an hour.

IV. Discussion

This study was conducted in the department of obstetrics and Gynecology GMC Srinagar. Vitamin D Deficiency in pregnancy is a worldwide health issue and Kashmir is also facing the same problem. In our study prevalence and various risk factors of vitamin D deficiency were assessed. The prevalence of vit D deficiency

was seen to be 68% (level<30ng/ml) with 8% having level less than 10ng/ml. Normal levels of Vit D was seen in 32% of patients. In studies done in India 84.3% of urban and 83.6% of rural women were having vit D levels below normal.¹⁸ Another study done in Korea showed 77.3% pregnant women were having vit D deficiency (level<20).¹⁹

Zargar AH et al assessed prevalence of vit D deficiency in healthy adults kashmir valley in 2007 which showed that 76% subjects had Vit D deficiency(50nmol/L).²⁰ Another study assessing the prevalence of vit D deficiency In kashmir by SA Mir found 77% women had vit D deficiency(<30ng/ml).²¹

V. Recommendation

The probable reasons of the widespread vit D deficiency in india could be due to low dietary vitamin D intake, high intake of fiber and phytates , reduced exposure to sunlight, pollution, reduced exposure of skin to sunlight because of cultural reasons. To reduce the prevalence of vit D deficiency following steps are recommended.

- 1 Increase public awareness regarding vit D deficiency, causes, long term consequences and treatment.
- 2 Increase awareness regarding prevention like daily sun exposure of half an hour.
- 3 Public health policies for food fortification of oils, milk, cereals with vit D.
- 4 Vit D supplementation should be made available at affordable rates
- 5 Prophylaxis programme be planned for vit D supplementation in pregnant ladies, lactating mothers, infants, children and elderly.

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