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VITAMIN D SUPPLEMENTATION AND ITS EFFECT ON PREGNANCY OUTCOME: A COMPARATIVE STUDY.

Dr. Rashmi Kumari[1], Dr. Usha Kumari[2], Dr. Krishna Sinha[3]
[1]Senior Resident, Department of Obstetrics and Gynecology, Jawaharlal Nehru Medical College and Hospital, Bhagalpur, Bihar, India.
[2]Professor & HOD, Department of Obstetrics and Gynecology, Jawaharlal Nehru Medical College and Hospital, Bhagalpur, Bihar, India.
[3]Associate Professor, Department of Obstetrics and Gynecology, Jawaharlal Nehru Medical College and Hospital, Bhagalpur, Bihar, India.

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Corresponding author: Dr. Rashmi Kumari
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Abstract

Aim: to determine the effect of vitamin D supplementation on pregnancy outcome.

Materials and methods: The present prospective comparative interventional study was conducted in the Department of Obstetrics and Gynecology, Jawaharlal Nehru Medical College and Hospital, Bhagalpur,Bihar,India. Total 80 patients were divided in to two groups. Group I (n=40): received only routine iron, folic acid and calcium supplementation (irrespective of vitamin D level). Group II (n=40): vitamin D supplementation (irrespective of vitamin D level) in the form of oral cholecalciferol sachet 60,000IU vitamin D weekly from 10 weeks of pregnancy until delivery along with routine iron, folic acid and calcium supplementation.

Results: Pre-eclampsia was observed in 22.5% of the patients who didn't receive vitamin D supplement whereas the group I which received supplementation showed on pre-eclampsia in 6.7% of the patients (p=0.001).

Conclusion: This study concludes that there is significant role of vitamin D supplementation in pregnant women in prevention of pre-eclampsia.

Keywords: pre-eclampsia, vitamin D, singleton

Introduction

Vitamin D is especially important during pregnancy as low maternal vitamin D stores may contribute to problems such as low birth weight and small for gestational age infants, as well an increased risk of maternal comorbidities.[1]

Vitamin D deficiency is worldwide epidemic, with a prevalence that ranges from 18% to 84% depending on the country of residence, ethnicity, and local clothing customs and dietary intake.[2,3] Clinical studies establishing an association between vitamin D levels and adverse pregnancy outcomes such as preeclampsia, gestational diabetes, and low birth weight, preterm labor, and caesarean delivery have conflicting results.[4]

Pre-ecclampsia is a pregnancy specific disorder characterized by new onset hypertension and proteinuria after 20 weeks of gestation.[5] Pre ecclampsia as identified by new onset hypertension and proteinuria during pregnancy, is a serious disorder affecting pregnancies, and is alleviated only by delivery of placenta.

Pre-ecclampsia is thought to originate in abnormal angiogenesis and immunologic adaptation occurring during implantation and trophoblast invasion at beginning of pregnancy. There is evidence that vitamin D affects transcription and function of genes responsible for trophoblast invasion, angiogenesis critical for implantation, and fetal allograft immunologic tolerance.[6] Vitamin D regulates angiogenic processes through direct effects on angiogenesis gene transcription, including vascular endothelial growth factor(VEGF).[7]

At present there is not enough evidence to establish the effectiveness of vitamin D supplementation in pregnancy and therefore, vitamin D supplementation is not routinely offered to all pregnant women. Hence the present study was conducted with the aim to determine the effect of vitamin D supplementation on pregnancy outcome.

Materials and method

The present prospective comparative interventional study was conducted in the Department of Obstetrics and Gynecology, Jawaharlal Nehru Medical College and Hospital, Bhagalpur, Bihar, India. Total 80 patients were divided in to two groups. **Group I (n=40):** received only routine iron, folic acid and calcium supplementation (irrespective of vitamin D level). **Group II (n=40):** vitamin D supplementation (irrespective of vitamin D level) in the form of oral cholecalciferol sachet 60,000IU weekly till 10

weeks along with routine iron, folic acid and calcium supplementation.

Inclusion criteria

- Age between 18 - 35 years
- Single pregnancy
- Period of gestation more than or equal to 28 weeks
- Who give informed consent

Exclusion criteria

- Women with chronic diseases before pregnancy, such as chronic hypertension, diabetes mellitus, kidney and liver diseases
- Gestational age less than 28 weeks
- History of intake of medications influencing bone, vitamin D or calcium metabolism e.g. antiepileptic, anti-tubercular drugs in the last 6 months.
- Not willing to participate

Ethical approval and Informed consent

The study protocol was reviewed by the Ethical Committee of the Hospital and granted ethical clearance. After explaining the purpose and details of the study, a written informed consent was obtained.

Sample selection

The sample size was calculated using a prior type of power analysis by G* Power Software Version 3.0.1.0 (Franz Faul, Universitat Kiel, Germany). The minimum sample size was calculated, following these input conditions: power of 0.80 and $P \leq 0.05$ and sample size arrived were 24 participants in each group. The final sample achieved was 40 per group.

A comprehensive general physical examination, systemic and obstetric examination was conducted at first antenatal visit for all the subjects were done.

Statistical analysis

The recorded data was compiled entered in a spreadsheet computer program (Microsoft Excel 2010) and then exported to data editor page of SPSS version 20 (SPSS Inc., Chicago, Illinois, USA). Descriptive statistics included computation of percentages, means and standard deviations were calculated. Statistical test applied for the analysis were student t-test and chi-square test. Level of significance was set at p≤0.05.

Results

Table 1: Demographic and clinical profile of the study population

Variables	Groups	Mean	Std. Deviation	p-value
Age (Years)	I	26.10	3.01	0.711 (NS)
	II	26.27	3.31	
Gestational Age weeks	I	33.06	3.28	0.414 (NS)
	II	33.41	3.19	
BMI	I	20.09	1.74	0.615 (NS)
	II	20.26	1.51	

Test applied: student t-test

Table 2: distribution as per parity in the study population

Groups	Parity				Total	p-value
	0	1	2	3		
I	21	9	6	4	40	0.205 (NS)
	52.5%	22.5%	15.0%	10.0%	100.0%	
II	19	14	4	3	40	
	47.5%	35.0%	10.0%	7.5%	100.0%	

Test applied: chi-square test

Table 3: distribution of mode of delivery in the study population

Variables	Mode of Delivery		Total	p-value
Groups	NVD	LSCS		
I	18	22	40	0.671 (NS)
	45.0%	55.0%	100.0%	
II	17	23	40	
	42.5%	57.5%	100.0%	

Test applied: chi-square test

Table 4: distribution of pregnancy outcome in the study population

Variables	Pregnancy Outcome		p-value
Groups	I	II	
Pre-eclampsia	9	3	0.026 (sig.)
	22.5%	7.5%	
GDM	6	2	0.054 (NS)
	15.0	5.0%	
Pre-term labor	8	3	0.042 (sig.)
	20.0	7.5%	

Test applied: chi-square test

Discussion

All the patients were assumed to be vitamin D deficient as Vitamin D deficiency prevails in epidemic proportions all over the Indian subcontinent, with a prevalence of 70%–100% in the general population. In India, widely consumed food items such as dairy products are rarely fortified with vitamin D.

The mean age in our study is 26.10 years among supplemented group and 26.27 years among non-supplemented group. The age distribution was comparable to that observed by Sachan et al.[8] mean age 24.0 years and F Xiang et al.[9] mean age 26.4 + 3.1 years.

Sablok et al.[10] found prevalence of vitamin D deficiency in pregnant women and to evaluate the effect of supplementation with cholecalciferol in improving vitamin D levels in pregnant women and evaluate its correlation with feto-maternal outcome. The intervention group received supplementation of vitamin D in dosages depending upon 25(OH)-D levels. 40% patients in group A and 20.3% patients in group B developed pre-eclampsia. The result of this study was comparable with our study. Hypponen et al.[11] This study suggests that low maternal serum 25 hydroxy vitamin D concentrations increases pre-

eclampsia risk and that vitamin D supplementation lowers this risk. The result of this study was comparable with our study.

De-RegilLM et al.[12] suggested that women who received vitamin D supplements may have a lower risk of preeclampsia than those receiving no intervention or placebo. The result of this study was comparable with our study.

Conclusion

This study concludes that that consumption of 60,000 IU vitamin D weekly from 10 weeks of pregnancy until delivery it has played a significant role in prevention of pre eclampsia. In the supplemented group the incidence of pre eclampsia was less.

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