International Journal of Reproduction, Contraception, Obstetrics and Gynecology
Chandel AB et al. Int J Reprod Contracept Obstet Gynecol. 2020 Jun;9(6):2314-2316
www.ijrcog.org
pISSN 2320-1770 | eISSN 2320-1789

DOI: http://dx.doi.org/10.18203/2320-1770.ijrcog20202303

Original Research Article

Vitamin D deficiency and maternal complications

Anu B. Chandel[1]*, Rita Mittal[1], Anoop Sharma[1], Shivika Mittal[2]

[1]Department of Obstetrics and Gynecology, Kamla Nehru Hospital, Shimla, Himachal Pradesh, India
[2]Department of Obstetrics and Gynecology, RPGMC, Tanda, Kangra, Himachal Pradesh, India

Received: 25 December 2019
Revised: 27 April 2020
Accepted: 02 May 2020

***Correspondence:**
Dr. Anu B. Chandel,
E-mail: anuchandel07@gmail.com

ABSTRACT

Background: Vitamin D deficiency is prevalent in India, a finding that is unexpected in a tropical country with abundant sunshine. Vitamin D deficiency is recognized as the most untreated nutritional deficiency currently in the world. Several studies reported the relationship between maternal vitamin D deficiency and adverse maternal and fetal outcomes including gestational diabetes, preeclampsia, preterm labour, low birth weight and increased rate of caesarean section.
Methods: The study was conducted in the department of obstetrics and gynecology, Kamla Nehru Hospital, Shimla, Himachal Pradesh, India over a period of 12 months. Six hundred women were included in the study.
Results: Forty-eight (8%) subjects developed preeclampsia-eclampsia syndrome, of which none had sufficient vitamin D levels, whereas 48 (100%) subjects had vitamin D deficiency.
Conclusions: Maternal antenatal complications are more common in vitamin D deficient group.

Keywords: Caesarean section, Gestational diabetes, Preeclampsia, Vitamin D deficiency

INTRODUCTION

Vitamin D deficiency is prevalent in India, a finding that is unexpected in a tropical country with abundant sunshine. Vitamin D deficiency is recognized as the most untreated nutritional deficiency currently in the world.[1]

In a population that already has a high prevalence of vitamin D deficiency and poor dietary calcium intake; the problem is likely to worsen during pregnancy because of the active transplacental transport of calcium to the developing fetus.[2] Several studies reported the relationship between maternal vitamin D deficiency and adverse maternal and fetal outcomes including gestational diabetes, preeclampsia, preterm labour, low birth weight and increased rate of caesarean section.[3]

In the light of existing evidences, public health interventions should be undertaken to reduce the incidence of vitamin D deficiency in antenatal mothers. Therefore, present study was undertaken to study the impact of vitamin D deficiency on maternal outcome.

METHODS

Observational study conducted in the department of obstetrics and gynecology, Kamla Nehru State Hospital for Mother and child, IGMC, Shimla, India w.e.f. 1st August 2017 to 31st July 2018.

All women fulfilling the inclusion criteria were included in the study.

Inclusion criteria

- Age 18-40 years
- Primigravida
- Confirmed viable singleton intrauterine pregnancy

- POG more than or equal to 28 weeks.

Exclusion criteria

- Current or past medical illness which may interfere with vitamin D and calcium levels such as hyperparathyroidism, collagen diseases, Cushing's disease, chronic renal disease, GI disease, lung cancer and ovarian tumors
- Taking medications that interfere with vitamin D and calcium
- Levels-anticonvulsants, corticosteroids, thiazides, thyroxine, heparin, antitubercular drugs
- Known case of diabetes, hypertension
- Multiple pregnancy
- Multiparity.

Six hundred women fulfilling the inclusion criteria at POG >=28 weeks of pregnancy and delivering in labour room of study hospital were included after written informed consent. Information on age, education, occupation, income, religion, diet, vitamin supplements and dairy products intake, exposure to sunlight etc., was obtained from the subjects using a questionnaire.

A fasting blood sample of minimum 2 ml was taken and was tested for serum 25(OH)D by CMIA (chemiluminescent microparticle immunoassay) method in hospital lab. LC-MS/MS (liquid chromatography-mass spectrometry) procedure was used for vitamin D quantification.

The patients were categorised as per the levels:

- Severe deficiency - <10 ng/ml
- Moderate deficiency- 10- 19.9 ng/ml
- Mild deficiency- 20-29.9 ng/ml
- Optimal level >=30 ng/ml.

Statistical analysis

All the data was entered in Microsoft excel 2007 spreadsheet. Categorical variables were analysed using Chi square and Fischer exact test. Continuous variables were analysed using the appropriate tests after checking for the normality distribution using Kolmogrov Smirnoff test.

- (S)=Significant
- (NS)=Not significant.

A p-value of 0.05 or less was considered statistically significant.

RESULTS

Out of 600 subjects, 32 (5.33%) subjects had sufficient vitamin D levels and 568 (94.67%) had vitamin D deficiency. Among the vitamin D deficient subjects, 46 (7.66%) had mild, 159 (26.50%) had moderate and 363 (60.50%) had severe vitamin D deficiency.

Among the total 600 subjects, 72 (12%) subjects developed gestational hypertension, out of which only 1 (1.39%) subject had sufficient vitamin D levels while 71 (98.61%) subjects had vitamin D deficiency.

Forty-eight (8%) subjects developed preeclampsia-eclampsia syndrome, of which none had sufficient vitamin D levels, whereas 48 (100%) subjects had vitamin D deficiency. Severe vitamin D deficiency was present in the 91.66% subjects (Table 1).

Table 1: Vitamin D levels and maternal complications.

Maternal complications	Vitamin D sufficiency (n=32)		Vitamin D deficiency (n=568)		Mild deficiency (n=46)		Moderate deficiency (n=159)		Severe deficiency (n=363)		p value
Gestational hypertension (n =72, 12%)	1	1.39%	71	98.61%	3	4.23%	18	25.35%	50	70.42%	0.19 (NS)
Preeclampsia-eclampsia (n = 48, 8%)	0	0%	48	100%	1	2.08%	3	6.25%	44	91.67%	0.188 (NS)
Gestational diabetes mellitus (n =30, 5%)	0	0%	30	100%	2	6.67%	4	13.33%	24	80%	0.388 (NS)
Preterm labour (n=73, 12.16%)	1	1.37%	72	98.63%	4	5.56%	9	12.5%	59	81.94%	0.18 (NS)

Thirty (5%) subjects were having gestational diabetes mellitus. Among these 30 subjects, none had sufficient vitamin D levels and 30 (100%) had vitamin D deficiency (Table 1). Among all the subjects, 73 (12.16%) had preterm labour, out of which merely 1 (1.37%) subject had sufficient vitamin D levels while 72 (98.63%) had vitamin D deficiency (Table 1). Thus, all the maternal

complications were predominantly seen in the vitamin D deficient group.

DISCUSSION

From this study it is clear that maternal complications like gestational hypertension, preeclampsia-eclampsia, GDM and preterm labour are more common in subjects having vitamin D deficiency (98.61%, 100%, 100% 98.64% respectively). Similar results are there in the studies conducted by Nageshu N et al, Chauhan N et al and Prasad D et al.[4-6]

Whereas GDM was seen equally in both vitamin D sufficient and vitamin D deficient group (50% versus 50%) in the study by Dave A et al and gestational hypertension was more in the vitamin D sufficient group (61.90%).[7] This disparity may be due to insufficient evidence because of low sample size.

However, it can be seen from various studies that low vitamin D levels are responsible for the various antenatal complications.

CONCLUSION

Routine screening of maternal vitamin D deficiency demonstrates the importance of detecting and treating maternal vitamin D deficiency during pregnancy in at risk patients. Failure to diagnose and institute treatment may carry significant risks to both mother and child which need to be researched and followed.

Prevalence of vitamin D deficiency was noted in this region and its association with pre-eclampsia was seen. Higher incidence of gestational hypertension, gestational diabetes mellitus and preterm labour was also seen in the deficient group.

So, more studies are required, however prophylactic administration of vitamin D along with calcium as is the practice mandatory is recommended. Encouragement of outdoor activities, and exposure to adequate sun light is recommended and highly desirable.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Van Schoor NM, Lips P. Worldwide vitamin D status. Best Pract Res Clin Endocrinol Metabol. 2011;25:671-80.
2. Vasundhara K, Swapna R, Prasannalatha A, Shruti K. Vitamin D supplementation in pregnancy and its correlation with fetomaternal outcome. Ann Nutr Disord Amp Ther. 2017;4(1):1037:1-5.
3. Ates S, Sevket O, Ozcan P, Ozkal F, Kaya MO, Dane B. Vitamin D status in the first trimester:effects of vitamin D deficiency on pregnancy outcomes. Afri Health Sci. 2016;16(1):36-43.
4. Nageshu S, Krishna K, Krishna L, Bhat B, Suma H, Reddy S. A study of prevalence of Vitamin D deficiency among pregnant women and its impact on feto maternal outcome. Int J Reprod Contracept Obstet Gynecol. 2016;4(4):1174-80.
5. Chauhan N, Pahuja N, Kalra V. Correlation of vitamin D levels with feto-maternal outcome. Int J Reprod Contracept Obstet Gynecol. 2017;7(1):137-41.
6. Prasad D, Singh K, Nisha S. Vitamin D in pregnancy and its correlation with feto maternal outcome. Int J Contemp Med Res. 2018;5(1):1-5.
7. Dave A, Verma AM, Jain N, Dave A. A study of vitamin D levels and associated deficiency in pregnancy and its effect on maternal and fetal outcome. Int J Reprod Contracept Obstet Gynecol. 2017;6(1):84-8.

Cite this article as: Chandel AB, Mittal R, Sharma A, Mittal S. Vitamin D deficiency and maternal complications. Int J Reprod Contracept Obstet Gynecol 2020;9:2314-6.