IJMRP

International Journal of Medical Research Professionals

Original Article

Analysis of Association of Prevalence of Pre-Eclampsia and Vitamin D Supplementation in Primigravida Women: An Institutional Based Study

Narendra Mitharam Zope

Assistant Professor, Department of Obstetrics and Gynaecology, Dr. Ulhas Patil Medical College and Hospital, Jalgaon, Maharashtra, India.

Article History
Received: 19 Dec 2015
Revised: 12 Jan 2016
Accepted: 28 Jan 2016

***Correspondence to:**
Dr. Narendra Mitharam Zope,
Assistant Professor, Department of Obstetrics and Gynaecology, Dr. Ulhas Patil Medical College and Hospital, Jalgaon, Maharashtra, India.

ABSTRACT

Background: Vitamin D deficiency and insufficiency are prevalent worldwide. Extensive epidemiological research indicates a significant occurrence of vitamin D deficiency among women, particularly in antenatal and lactating populations. Hence; the present study was conducted to analyze association of prevalence of pre-eclampsia and vitamin d supplementation in primigravida women.

Materials & Methods: A total of 200 subjects were enrolled in the present study. Inclusion criteria for the present study included primigravida subjects who were more than 18 years of age. Patients with history of any other systemic illness were excluded from the present study. Patients with any disorders affecting levels of vitamin-D Patients satisfying the inclusion criteria were included and divided in to 2 groups of 100 subjects each: Study group and control group. Study group underwent baseline vitamin D estimation and were given weekly oral supplements of Vitamin D (60,000 IU) until delivery. No supplement was given in control group. Both the groups received regular antenatal care. Incidence of preeclampsia was noted at any point of time subsequent to recruitment into the study.

Results: Mean age of the patients of study group and control group was 31.2 years and 30.6 years respectively. mean vitamin D levels among study group and control group was 23.3 ng/ml and 25.1 ng/ml respectively. Pre-eclampsia was seen in 4 percent of the patients of the study group and in 15 percent of the patients of the control group. significant results were obtained while comparing the incidence of pre-eclampsia among the two study groups.

Conclusion: Maternal deficiency in vitamin D may serve as an independent risk factor for the development of preeclampsia. Investigating the potential benefits of vitamin D supplementation during early pregnancy could be crucial for the prevention of preeclampsia and the enhancement of neonatal health.

KEYWORDS: Vitamin D, Primigravida, Pre-eclampsia.

INTRODUCTION

Vitamin D deficiency and insufficiency are prevalent worldwide. Extensive epidemiological research indicates a significant occurrence of vitamin D deficiency among women, particularly in antenatal and lactating populations.[1-3]

The demand for vitamin D is likely heightened during pregnancy, as indicated by the increased levels of 1,25-dehydroxy vitamin D observed in the second and third trimesters. Although there is no direct correlation between 1,25(OH)2D levels and 25-hydroxy vitamin D concentrations, the physiological elevation of the active metabolite, along with improved intestinal calcium absorption and the increased fetal calcium requirement (approximately 250 mg/day in the third trimester), underscores the critical role of vitamin D in pregnancy.[4] The musculoskeletal effects of vitamin D deficiency are well-documented, with conditions such as rickets and osteomalacia being associated with this deficiency for nearly a century. Additionally, a growing body of literature is exploring the various metabolic and nonskeletal implications of vitamin D deficiency, with several studies suggesting connections between low vitamin D levels and different components of the metabolic syndrome.[5] During pregnancy, the serum concentrations of 1,25(OH)D can rise by as much as twofold, beginning around 10 to 12 weeks of gestation

and peaking in the third trimester. The changes in 25(OH)D levels during pregnancy remain uncertain. Nevertheless, the elevation of the active form of vitamin D indicates that pregnant women may experience increased cellular exposure to vitamin D during the second and third trimesters, implying a potential significance of vitamin D for maternal and fetal health.[6-8] Hence; the present study was conducted to analyze association of prevalence of pre-eclampsia and vitamin d supplementation in primigravida women.

MATERIALS & METHODS

A total of 200 subjects were enrolled in the present study. Inclusion criteria for the present study included primigravida subjects who were more than 18 years of age. Patients with history of any other systemic illness were excluded from the present study. Patients with any disorders affecting levels of vitamin-D Patients satisfying the inclusion criteria were included and divided in to 2 groups of 100 subjects each: Study group and control group. Study group underwent baseline vitamin D estimation and were given weekly oral supplements of Vitamin D (60,000 IU) until delivery. No supplement was given in control group. Both the groups received regular antenatal care. Incidence of preeclampsia was noted at any point of time subsequent to recruitment into the study. All the results were recorded in Microsoft excel sheet and was subjected to statistical analysis using SPSS software.

RESULTS

The mean age of the patients of study group and control group was 31.2 years and 30.6 years respectively. mean vitamin D levels among study group and control group was 23.3 ng/ml and 25.1 ng/ml respectively. Pre-eclampsia was seen in 4 percent of the patients of the study group and in 15 percent of the patients of the control group. significant results were obtained while comparing the incidence of pre-eclampsia among the two study groups.

Table 1: Demographic data

Variable	Study group	Control group
Mean age (years)	31.2	30.6
Rural residence	62	55
Urban residence	38	45
Mean vitamin D levels (ng/ml)	23.3	25.1

Table 2: Incidence of pre-eclampsia

Pre-eclampsia	Study group	Control group
Number	4	15
Percentage	4	15
p-value	0.0012 (Significant)	

DISCUSSION

A The role of vitamin D during pregnancy for both the mother and the developing fetus is not yet fully understood. It is established that vitamin D plays a critical role in maintaining skeletal health during this period, as highlighted by recent studies addressing craniotabes in newborns. Furthermore, significant vitamin D deficiency can result in neonatal seizures due to severe hypocalcemia. However, the implications of vitamin D during this crucial time may extend beyond skeletal health, potentially influencing various other systems, including immune, pancreatic, musculoskeletal, and cardiovascular functions, as well as neural development. Recent research has indicated a correlation between maternal vitamin D levels and negative pregnancy outcomes, such as preeclampsia and the necessity for cesarean delivery.[8-10]

Hence; the present study was conducted to analyze association of prevalence of pre-eclampsia and vitamin d supplementation in primigravida women.

Mean age of the patients of study group and control group was 31.2 years and 30.6 years respectively. mean vitamin D levels among study group and control group was 23.3 ng/ml and 25.1 ng/ml respectively. Pre-eclampsia was seen in 4 percent of the patients of the study group and in 15 percent of the patients of the control group. significant results were obtained while comparing the incidence of pre-eclampsia among the two study groups.

Hollis BW et al assessed 494 women enrolled; among them 350 women continued until delivery: Mean 25(OH)D concentrations by group at delivery and 1 month before delivery were significantly different ($p < 0.0001$), and the percent who achieved sufficiency was significantly different by group, greatest in 4000-IU group ($p < 0.0001$). The relative risk (RR) for achieving a concentration of 80 nmol/L or greater within 1 month of delivery was significantly different between the 2000- and the 400-IU groups (RR = 1.52, 95% CI 1.24-1.86),

the 4000- and the 400-IU groups (RR = 1.60, 95% CI 1.32-1.95) but not between the 4000- and. 2000-IU groups (RR = 1.06, 95% CI 0.93-1.19). Circulating 25(OH)D had a direct influence on circulating 1,25(OH)(2)D(3) concentrations throughout pregnancy ($p < 0.0001$), with maximal production of 1,25(OH)(2)D(3) in all strata in the 4000-IU group. There were no differences between groups on any safety measure. Not a single adverse event was attributed to vitamin D supplementation or circulating 25(OH)D levels. It is concluded that vitamin D supplementation of 4000 IU/d for pregnant women is safe and most effective in achieving sufficiency in all women and their neonates regardless of race, whereas the current estimated average requirement is comparatively ineffective at achieving adequate circulating 25(OH)D concentrations.[10] Haugen M et al estimated the association between intake of vitamin D during pregnancy and the risk of preeclampsia in 23,423 nulliparous pregnant women taking part in the Norwegian Mother and Child Cohort Study. Participating women answered questionnaires at gestational week 15 (general health questionnaire), at week 22 (food frequency questionnaire), and at week 30 (general health questionnaire). The odds ratio of preeclampsia for women with a total vitamin D intake of 15-20 microg/d compared with less than 5 microg/d was 0.76 (95% confidence interval = 0.60-0.95). Considering only the intake of vitamin D from supplements, we found a 27% reduction in risk of preeclampsia (OR = 0.73 [0.58-0.92]) for women taking 10-15 microg/d as compared with no supplements. No association was found between intake of vitamin D from the diet alone and the occurrence of preeclampsia. These findings were consistent with other reports of a protective effect of vitamin D on preeclampsia development.[11]

CONCLUSION

Vitamin D is an integral component of a sophisticated steroid hormone system that has been recognized for its role in bone metabolism for an extended period. Maternal deficiency in vitamin D may serve as an independent risk factor for the development of preeclampsia. Investigating the potential benefits of vitamin D supplementation during early pregnancy could be crucial for the prevention of preeclampsia and the enhancement of neonatal health.

REFERENCES

1. Mithal A, Wahl DA, Bonjour JP, Burckhardt P, Dawson-Hughes B, Eisman JA, et al. Global vitamin D status and determinants of hypovitaminosis D. Osteoporos Int. 2009;20:1807–20.

2. Sahu M, Bhatia V, Aggarwal A, Rawat V, Saxena P, Pandey A, et al. Vitamin D deficiency in rural girls and pregnant women despite abundant sunshine in northern India. Clin Endocrinol (Oxf) 2009;70:680–4.

3. Fudge J, Kovacs CS. Pregnancy up-regulates intestinal calcium absorption and skeletal mineralization independently of the vitamin D receptor. Endocrinology 2010; 151:886–895.

4. Bodnar LM, Catov JM, Simhan HN, et al. Maternal vitamin D deficiency increases the risk of preeclampsia. J Clin Endocrinol Metab 2007; 92:3517–3522.

5. Baker AM, Haeri S, Camargo CA, et al. A nested case-control study of midgestation vitamin D deficiency and risk of severe preeclampsia. J Clin Endocrinol Metab 2010; 95:5105–5109.

6. Dasgupta A, Saikia U, Sarma D. Status of 25(OH)D levels in pregnancy: A study from the North Eastern part of India. Indian J Endocrinol Metab. 2012;16:S405–7.

7. Specker BL. Does vitamin D during pregnancy impact offspring growth and bone? Proc Nutr Soc. 2012;71:38–45.

8. Camargo CA, Ingham T, Wickens K, et al. Cord-blood 25-hydroxyvitmamin D levels and risk of respiratory infection, wheezing, and asthma. Pediatrics 2011; 127:e180–e187.

9. Erkkola M, Kaila M, Nwaru BI, et al. Maternal vitamin D intake during pregnancy is inversely associated with asthma and allergic rhinitis in 5-year-old children. Clin Experiment Allergy 2009; 39:875–882.

10. Hollis BW, Johnson D, Hulsey TC, Ebeling M, Wagner CL. Vitamin D supplementation during pregnancy: double-blind, randomized clinical trial of safety and effectiveness. J Bone Miner Res. 2011 Oct;26(10):2341-57.

11. Haugen M, Brantsaeter AL, Trogstad L, Alexander J, Roth C, Magnus P, Meltzer HM. Vitamin D supplementation and reduced risk of preeclampsia in nulliparous women. Epidemiology. 2009; 20 (5): 720-6.

Cite this article as: Narendra Mitharam Zope. Analysis of Association of Prevalence of Pre-Eclampsia and Vitamin D Supplementation in Primigravida Women: An Institutional Based Study. Int J Med Res Prof. 2016, 2(1); 214-16.