

THE PREVALENCE OF VITAMIN D DEFICIENCY AMONG ANTENATAL CASES & ITS CORRELATION WITH ADVERSE PREGNANCY OUTCOMEReema Kumar Bhatt¹, Naresh Bansal^{*2}, S. Yadav³ and Dr. Pooja⁴

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ABSTRACT

Background: This study was carried out to Study the prevalence of vitamin D deficiency among antenatal cases & to determine the correlation between vitamin D levels and possibility of adverse pregnancy outcome. **Methods:** One thousand patients who fulfilled inclusion and exclusion criteria were selected and written consent was taken. The 25- hydroxy vitamin D3 level was estimated twice during the study period first at first trimester and again at the time of delivery. The pregnancy outcome was based on Vit D levels at the time of enrolment in study at first visit. The Vit D levels was grouped into three categories (<10 ng/ml, 10-30ng/ml and 30-100ng/ml). The study subjects were supplemented with Vit D3 (60,000 unit) orally per month till delivery if the Vit D3 level is <30ng/ml. The effect of Vit D3 level on the possibility of adverse pregnancy outcome was observed by Mode of Delivery, Birth weight, IUGR, IUD/Still birth, Anemia, Preeclampsia, Gestational diabetes mellitus (GDM). **Results:** The prevalence of Vit D deficiency among antenatal mothers was 91% and were supplemented with Vitamin D. In this study, vitamin D levels were significantly associated with parity, gestational age, mode of delivery and occurrence of pre-eclampsia and gestational diabetes mellitus. However, there was no significant association of Vit D levels with age, religion, IUGR, IUD/Still birth and anemia. **Conclusion:** The Vit D deficiency is widely prevalent and supplementation increases the vitamin D level significantly. In terms of neonatal outcomes, low vitamin D levels at enrollment was associated with low birth weight and IUGR but was not statistically significant. The preeclampsia and gestational diabetes mellitus was significantly more in vitamin D deficient mothers. The vitamin D supplementation during pregnancy might improve the adverse pregnancy and birth outcomes.

KEYWORDS: Vitamin D deficiency, Gestational Diabetes mellitus, Preeclampsia, Preterm delivery, Still birth.**INTRODUCTION**

The prevalence of vitamin D deficiency has increased in recent years, and it is now recognized as a common global health concern and an ongoing pandemic.^[1-2] Moreover, low levels of vitamin D during pregnancy have been reported in many populations worldwide, even in those with abundant sun exposure.^[3-8] Previous findings have reported a varied prevalence of 18 to 84% for hypovitaminosis D during pregnancy, depending on the population studied.^[9]

Although available data suggest the significant role for vitamin D deficiency in women's reproductive health, the maternal and fetal function of vitamin D during pregnancy is not deeply recognized. One potential role of vitamin D during pregnancy is modulation of immune response,^[10] however, evidence shows that it may also have functions on musculoskeletal,^[11] and cardiovascular systems,^[12-15] as well as neural development of the fetus.^[10] It has been postulated that vitamin D deficiency could be associated with increased risk of preeclampsia,

gestational diabetes mellitus, caesarean section and bacterial vaginosis in pregnancy.^[16]

A number of observational studies showed that maternal hypovitaminosis D (as defined by maternal 25 - hydroxyvitamin D [25(OH) D] levels <20 ng/ml or <50 nmol/l) is a significant risk factor for adverse fetal and neonatal outcomes.

The present study was designed to study the prevalence of vitamin D deficiency among antenatal women & to determine the association between vitamin D levels and adverse pregnancy outcome, if any. This study is unique and one of pioneer in its field that was conducted at the tertiary care institute.

MATERIALS AND METHODS

One thousand patients attending antenatal OPD were recruited in the study after getting informed written consent. The Vit D3 level was estimated twice during the study period at first trimester and again at the time of

delivery. The pregnancy outcome was based on Vit D levels at the time of enrolment in study at first visit. The Vit D levels was grouped into three categories (<10 ng/ml, 10-30ng/ml and 30-100ng/ml). The study subjects were supplemented with Vit D3 (60,000 unit) orally per month till delivery if the Vit D3 level is <30ng/ml. The effect of Vit D3 level on the possibility of adverse pregnancy outcome was observed by Mode of Delivery, Birth weight, IUGR, IUD/Still birth, Anemia, Preeclampsia, Gestational diabetes mellitus (GDM).

Inclusion criteria

The inclusion criteria were women with singleton pregnancy in the absence of medical illnesses.

Exclusion criteria

The exclusion criteria were multiple pregnancy, medical disorders complicating pregnancy like heart disease,

jaundice, surgical causes during pregnancy like cholestasis, renal stone, portal hypertension. Pregnancy with any gynecological condition or any congenital anomaly were also excluded from the study.

RESULTS

The prevalence of Vit D deficiency among antenatal mothers was 90.6%. The supplementation increased the vitamin D levels at term which was statistically significant. Almost 72% of the patients enrolled were multiparous and 75.4% had gestational age ≥ 37 weeks. The low vitamin D levels was significantly associated with parity, gestational age, mode of delivery and occurrence of pre-eclampsia and Gestational Diabetes mellitus. In terms of neonatal outcomes, low vitamin D levels at enrollment was associated with low birth weight and IUGR but was not statistically significant.

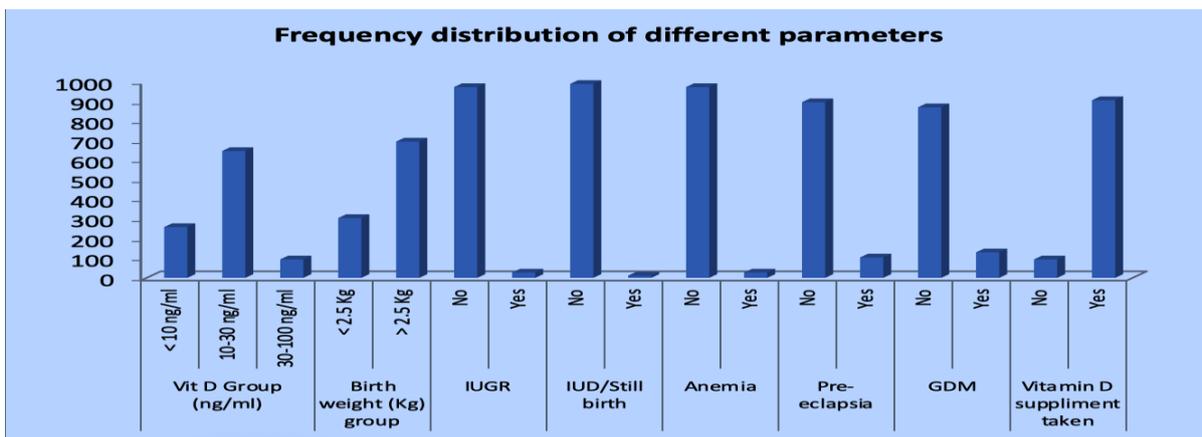


Fig. 1: Frequency Distribution of Different Parameters.

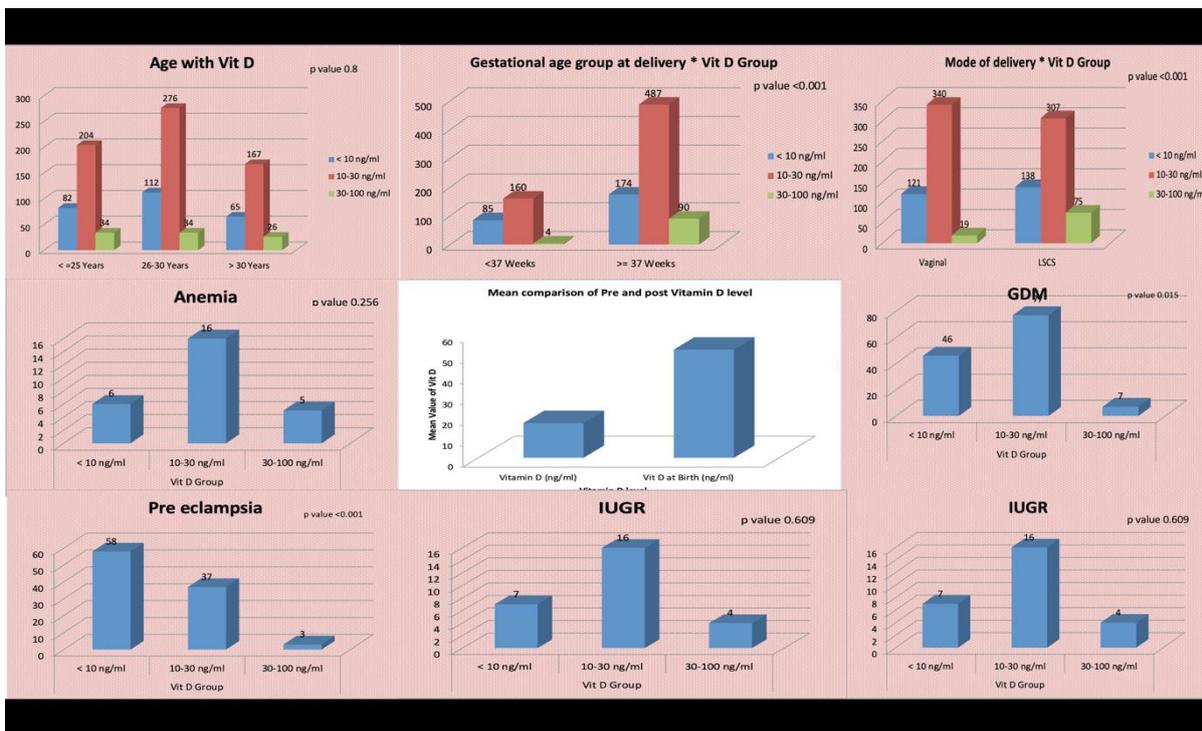


Fig. 2: Comparison of different parameters as per Vitamin D group.

DISCUSSION

Vitamin D deficiency is one of the most prevalent disorders among mothers and children.^[17] Although in the past few decades, early diagnosis of vitamin D deficiency and availability of supplementations and treatment modalities have improved the deficiency condition; hypovitaminosis D still exists as a major public health concern associated with significant morbidities in a variety of countries.^[18]

There is significant role for vitamin D deficiency in women's reproductive health but the maternal and fetal function of vitamin D during pregnancy is not deeply recognized. Low maternal vitamin D levels during pregnancy have been associated with a plethora of adverse pregnancy outcomes and this association has been extensively investigated in the past years. It is likely that vitamin D deficiency could be associated with increased risk of preeclampsia, gestational diabetes mellitus, caesarean section, low birth weight, and preterm birth.^[16]

Despite the safety of maternal supplementation in preventing vitamin D deficiency during pregnancy, at the moment there is no certain preventive or intervention strategy to ensure maternal vitamin D sufficiency. Therefore, the effect of vitamin D supplementation in pregnant women remains an arguable problem.

This is the pioneer study conceptualized in this field as the evidence on whether vitamin D supplementation should be given as a part of routine antenatal care to all women to improve maternal and infant outcomes remains unclear.

This seminal research article was aimed at evaluating the prevalence of vitamin D deficiency among antenatal women & to determine the association between vitamin D levels and adverse pregnancy outcome, if any.

In the present study conducted in our hospital we found a significant association of vit D deficient women with parity, gestational age, mode of delivery and occurrence of pre-eclampsia and Gestational Diabetes mellitus.

Our study is in line with various other studies carried out on the subject. A study on 655 pregnant women in Canada, showed that lower concentrations of vitamin D in the first trimester as a risk factor for developing gestational diabetes.^[19] Different meta- analyses of observational studies have been conducted on GDM and they all reported lower vitamin D concentrations in women with gestational diabetes.^[20-24]

Wei et al. analysed 24 observational studies and also found an increased risk of preeclampsia in women with vitamin D concentrations below 20 ng/mL.^[21] Another recent meta-analysis of 27 randomized controlled trials showed that vitamin D supplementation could reduce the risk of preeclampsia by 57%.^[25]

Wagner et al. who observed a 57% lower risk of preterm delivery in women with vitamin D concentrations higher than 40ng/mL compared to women with vitamin D levels below 20 ng/mL.^[26] In American pregnant women of mixed ethnicity, a significantly higher risk of caesarean section was associated with low vitamin D concentrations.^[27,28]

In terms of neonatal outcomes, low vitamin D levels at enrollment was associated with low birth weight and IUGR but was not statistically significant. In other observational studies, maternal vitamin D deficiency has been associated with risk of SGA in several general obstetric populations across the US and Europe.^[29-33]

This study clearly demonstrates vitamin D supplementation during pregnancy might improve the adverse pregnancy and birth outcomes.

CONCLUSION

The present prospective clinical study was carried out with 1000 patients attending the outpatient department of Obstetrics and Gynecology of a tertiary care hospital.

The patients were subjected to take plasma for 25-hydroxy vitamin D estimation in the first trimester and were grouped according to the 25- hydroxy vitamin D levels (<10 ng/ml, 10-30ng/ml and 30-100ng/ml). The prevalence of Vit D deficiency among antenatal mothers was 90.6%. There was significant increase in vitamin D levels at term with supplementation.

The low vitamin D levels was significantly associated with parity, gestational age, mode of delivery and occurrence of pre-eclampsia and Gestational Diabetes mellitus. In terms of neonatal outcomes low vitamin D levels at enrollment was associated with low birth weight and IUGR but was not statistically significant.

Thus, it may be suggested that the vitamin D supplementation during pregnancy might improve the adverse pregnancy and birth outcomes.

Further larger multicentric studies should be carried out to establish the correlation between vitamin D level and adverse pregnancy outcome in vitamin D deficiency in antenatal cases.

Keeping in view of the results and facts, the following are strongly recommended:

1. The Vitamin D supplementation in pregnancy is safe and can thus be recommended to all antenatal cases given its potential benefits.
2. The vitamin D supplementation is of value in reducing the risk of pregnancy complications such as gestational diabetes, preeclampsia, and preterm labour.
3. Further larger multicentric studies should be carried out to establish the correlation between vitamin D

level and adverse pregnancy outcome in vitamin D deficiency in antenatal cases.

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