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Original Research Article

Correlation between vitamin D levels in third trimester and postpartum hemorrhage

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ABSTRACT

Background: The aim of this study was to assess the correlation between antenatal vitamin D levels and postpartum hemorrhage.
Methods: An analytical study was conducted among 385 term pregnant women admitted at Hassan institute of Medical Sciences and who went in spontaneous onset of labour or induced labour. Basic demographic details were noted. Vitamin D levels were assessed on admission in these patients prior to childbirth. Incidence of postpartum haemorrhage among these patients after delivery were noted and analysed.
Results: Vitamin D levels were deficient in 225 (58.5%) antenatal women in the study. The overall rates of atonic postpartum haemorrhage were higher in vitamin D deficient women that is 19 (54.2%) when compared to woman having normal vitamin D levels.
Conclusions: Our results suggest that vitamin D deficiency is highly prevalent among pregnant woman and is a risk factor for atonic postpartum hemorrhage. Hence antenatal supplementation of vitamin D could help prevent vitamin D deficiency and uterine atony.

Keywords: Postpartum hemorrhage, Uterine atony, Vitamin D

INTRODUCTION

Postpartum haemorrhage (PPH), defined as estimated blood loss of at least 500 mL following a vaginal delivery or 1000 mL after a caesarean delivery within 24 h postpartum and is one of the most common causes of maternal mortality worldwide.[1,2] Uterine atony is the most common cause of PPH, which contributes to up to 80% of cases.[3]

Vitamin D is a fat soluble steroid hormone which is essential for calcium and phosphorous homeostasis. Endocrine society defines deficiency of vitamin D as serum levels of 25-hydroxyvitamin D below 20ng/ml and levels between 20 and 30ng/ml as insufficient.[4] The global prevalence of vitamin D deficiency is about 54-100% whereas prevalence of vitamin D insufficiency ranges between 39-76%.[5]

Serum calcium status which is regulated by vitamin D, plays a role in smooth muscle function and hence uterine contractility. Serum vitamin D deficiency which causes decrease in serum levels, thereby affecting the contractility of uterine smooth muscle, which may result in atonic uterus and hence atonic postpartum haemorrhage. Hence, the present study was conducted to determine the association of serum vitamin D levels with incidence of postpartum haemorrhage.

METHODS

This was an analytical study.

Study place

This study was conducted at Department of Obstetrics and Gynaecology, Hassan institute of Medical Sciences from September 2022 to January 2023.

Inclusion criteria

All women admitted in the department of Obstetrics and Gynaecology in the 3rd trimester for spontaneous onset of labour or labour induction, after obtaining consent were included.

Exclusion criteria

Moderate to severe anaemia, thrombocytopenia, coagulation disorders, PIH, other co morbidities were excluded.

Procedure

Women admitted to ANC ward for spontaneous onset of labour or labour induction were considered as subjects. With 95% Confidence level and 5% margin of error and assuming that 50% of the pregnant women have Vitamin D deficiency, the minimum sample size was estimated to be 385. Basic demographic details were noted. Vitamin D levels were assessed in these patients prior to childbirth. Incidence of postpartum haemorrhage among these patients after delivery were noted and analysed. Approval obtained from the institutional ethical committee.

Statistical analysis

Data was collected and exported to Microsoft Excel sheet version 16.2. For statistics analysis statistical software was used. Results were tabulated using Graphs, pie charts and bar diagrams. Frequencies and proportions were calculated in percentages.

RESULTS

In the present study, out of the total 385 patients about 265 (68.83%) patients were aged between 18-30 years and about 120 (31.17%) patients were aged between 31-40 years (Table 1). Considering our laboratory values of normal vitamin D levels to be 20-65ng/ml, about 160(41.5%) antenatal patients in their 3rd trimester had normal vitamin D levels. Vitamin D levels were deficient in 225 (58.5%) patients (Figure 1).

Table 1: Age wise distribution of patients.

Age (years)	Number of patients	Percentage
18-30	265	68.83
31-40	120	31.17
>40	0	0

Out of the 385 subjects in our study, 35 (9%) women had uterine atony post delivery leading to atonic postpartum hemorrhage. It was found that about 19 (54.2%) women who had atonic postpartum hemorrhage had vitamin D deficiency whereas about 45.8% women had normal vitamin D levels (Table 2).

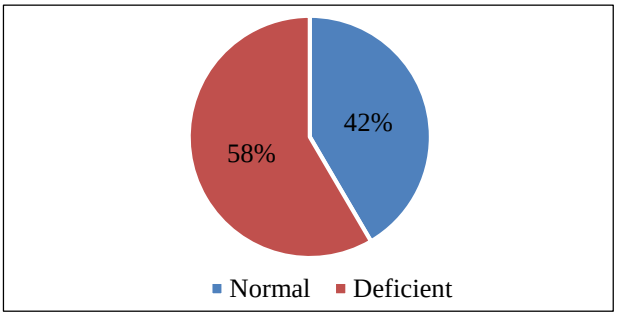

Figure 1: Levels of vitamin D in study population.

Table 2: Vitamin D levels in atonic postpartum hemorrhage patients.

Vitamin D levels	Atonic PPH patients	Percentage
Normal	16	45.8
Deficient	19	54.2
Total	35	100

DISCUSSION

Several reports indicate an association between low vitamin D levels and an increased risk of developing pregnancy complications such as impaired glucose tolerance and gestational diabetes, disorders of placental implantation, pre-eclampsia, fetal growth retardation, gestational hypertension, preterm birth, caesarean section, and other adverse conditions.[6-9] Studies have also shown higher incidence of postpartum depression in cases of vitamin D deficiency.[10]

In our study, on analysing the levels of vitamin D in pregnant women, it was found that a majority of about 58% pregnant woman had vitamin D deficiency, which was similar to the results of Abida et al in a study conducted at Pakistan, where they observed out of total 200 patients enrolled 141 (70.5%) had low levels of vitamin D.[11]

On evaluating women who had atonic postpartum hemorrhage, it was found that 54.2% women who had atonic postpartum hemorrhage had vitamin D deficiency. This was similar to the results obtained by Khan et al where a positive correlation between low levels of vitamin D and ineffective uterine musculature contraction was noted showing low vitamin D levels in 87% of patients having uterine atony and 68% in controls with normal uterine tone.[12]

In our small study a positive correlation was noted between vitamin D deficiency and atonic postpartum hemorrhage.

This study has some limitations. Other risk factors for postpartum hemorrhage are not considered in our study which could also be the major causative factor for occurrence of postpartum haemorrhage.

CONCLUSION

The incidence and prevalence of vitamin D deficiency in pregnant women are on a rising trend. In our study we have concluded the correlation of vitamin D deficiency with prevalence of postpartum hemorrhage. Hence it is essential to supplement antenatal women with vitamin D supplements to reduce the burden of vitamin D deficiency and hence uterine atony to prevent postpartum hemorrhage.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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