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RELATIONSHIP BETWEEN MATERNAL VITAMIN D DEFICIENCY AND LOW BIRTH WEIGHT NEONATES.

Obstetrics & Gynaecology

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ABSTRACT

Background: High prevalence of vit D deficiency (about a billion) has been seen among people all over the world. Vitamin D (vit D) has a key role in fetal growth by its interaction with parathyroid hormone and Ca2 + homeostasis. Studies confirmed that insufficient prenatal and postnatal levels of vit D have great effects on poor bone mineralization which have significant association with small for gestation age (SGA).
Aim: To explore the role of Antenatal Vitamin D intake in prevention of Low Birth weight babies.
Materials and methods: Observational case control study involving 100 delivered women divided into two equal groups -One with women with babies with weight less than 2500 gm and another group with women with babies with weight more than 2500 gm.
Maternal serum 25 (OH) vitamin D assay was done by immunoassay method. Data was collected and included in a data based system and analysed by statistician.
Results: Increasing maternal age showed a significant decrease in serum vitamin D levels. Increasing BMI was associated with vitamin D deficiency and low birth weight babies. In the study maternal vitamin D deficiency was found to be a single best predictor for low birth weight baby.
Conclusion: Based on the results from the study, it can be said that there is a significant correlation between maternal vitamin D deficiency and low birth weight baby.
The study also showed the influence of other variable like age, parity, complexion, pre pregnancy BMI, BMI at time of delivery, previous h/o low birth weight baby, diet and haemoglobin. Larger studies with increased sample size and also long term effect of vitamin D supplementation are prudent.

KEYWORDS

VITAMIN D, LOW BIRTH WEIGHT

INTRODUCTION

Despite discovery of vitamin D a hundred years ago, it has been recently emerged as one of the most controversial Nutrients and prohormones of 21st century.

It is found to play a major role in calcium metabolism and bone health.

Normal vitamin D level is also very much needed for prevention of type 2 diabetes, Gestational diabetes mellitus, preeclampsia, cancer, preterm birth and low birth weight. Vitamin D has recently been found to promote insulin action, immunomodulation and lung function. Thus it is found to play a very important role in development of foetus.

Maternal hypocalcemia may lead to development of preeclampsia and neonatal hypocalcemia, which in turn is determined by maternal vitamin D levels.

Vitamin D is found to play a very important role in promoting foetal growth by influencing parathyroid hormone and calcium balance.

According to ACOG guidelines
Vitamin D Deficiency is serum level less than 32ng/dl.
According to ENDOCRINE SOCIETY
Vitamin D deficiency is serum level less than 20 ng/dl.
Vitamin D insufficiency is serum level 20 to 29ng/dl.

There are several studies depicting that maternal vitamin D deficiency is associated with low birth weight babies.

In this study we are intended to compare the maternal vitamin D status between LBW and normal birth weight neonates.

OBJECTIVES:

To find out the correlation between maternal vitamin D levels and low birth weight babies.

To study the relationship between serum maternal vitamin D levels and low birth weight babies.

To explore the role of antenatal vitamin D intake in prevention of low birth weight babies.

MATERIALS AND METHOD:

It was an observational case control study involving 100 delivered women divided into two equal groups. One with women with babies with weight less than 2500 gm and another group with women with babies with weight more than 2500 gm.

SAMPLE COLLECTION:

In order to determine maternal vitamin D level, immediately two hours after delivery 5ml of mothers blood will be collected, labelled and sent to laboratory to assay serum 25 (OH) vitamin D level by 25 hydroxy vitamin D enzyme immunoassay method. Depending on mother's 25(OH) vitamin D level. All mothers were categorised in

- Deficient <25 ng/dl
- Insufficient 25 to 50 ng/dl
- Normal >50 ng/dl
- Toxic level >250 ng/Dl

INCLUSION CRITERIA:

All cases of singleton gestation

- Term neonates with birth weight (>2500 gm) and their mothers.
- Term neonates with birth weight (<2500 gm) and their mothers.
- Mode of delivery either vaginally or by caesarean section.

EXCLUSION CRITERIA:

Mothers with

- Pre eclampsia
- Eclampsia
- Post partum haemorrhage
- Insulin dependent diabetes
- Twins pregnancy
- Systemic and chronic disease
- Haemotology disorder
- Drug abuse
- Neonates with congenital malformation and infection.

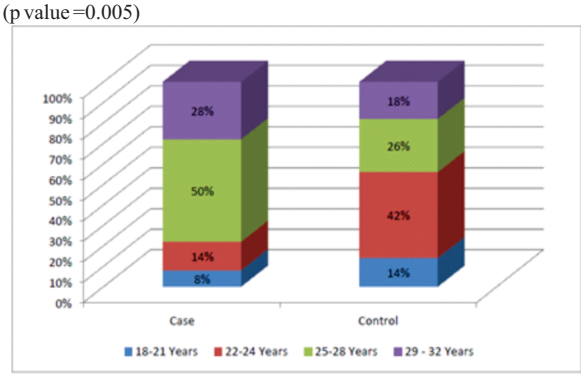
Data was collected and included in a data based system and analysed by statistician. Parametric data was expressed as mean I and standard deviation. It was analysed statistically using t-test and non parametric data was expressed as percentages and analysed using chi square receiver operator characteristics analysis were used to identify the optimal threshold values of 25(OH) vitamin D and correlation with low birth weight babies.

RESULTS AND DISCUSSION:

Analysis of low levels of vitamin d3 as predictors for low birth weight

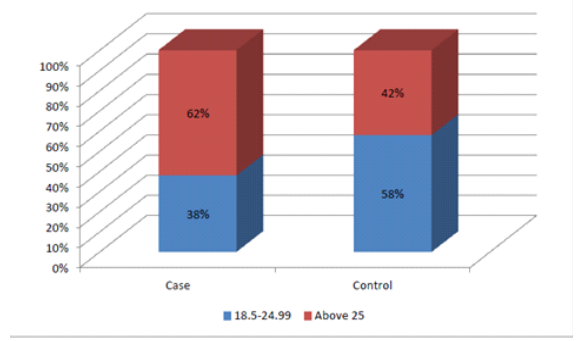
babies (>2.5kg) was done. In this study age, parity, pre pregnancy BMI, BMI at time of delivery ,HB, complexion and mode of delivery were assessed.

The mean age group in which vitamin D deficiency was seen was above 25 years.39 cases occurred above 25 years of age. out of which 25 cases (64.1%) occurred between 25 to 28 years and 14 cases (35.9%) occurred between 29 to 32 years. In our study, increasing maternal age showed a significant decrease in serum vitamin D levels (p value =0.005)

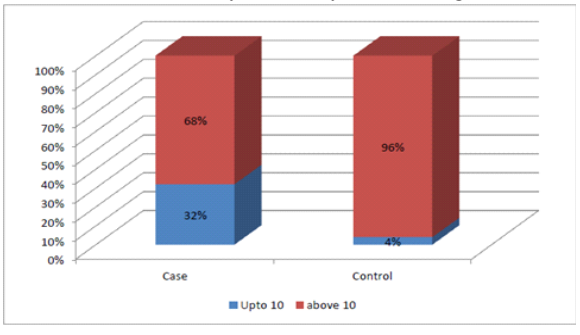


In this study there was 51% primi and 49% multi as a whole and among cases primi was 52% and multi was 48%. Among control ,primi and muti were each 50%. Thus there was no significant correlation between parity and vitamin D deficiency.

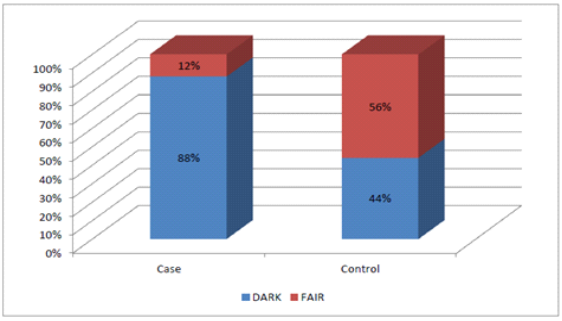
In this study there was a significant correlation between pre pregnancy BMI and BMI at time of delivery. Increasing BMI (obesity) was associated with vitamin D deficiency and low birth weight babies. Circulating levels of vitamin D3 was found to be low in obese individuals compared to lean individuals. There are several mechanism behind it such as lower vitamin D intake or reduced intestinal absorption, decreased uvb exposure or cutaneous synthesis, deposition of vitamin D in excess adipose tissue.



In this study mean HB in cases among vitamin D deficiency individuals was found to be 10.3 compared to 10.84 among control group. It also showed that 96% of women in control group was found to have HB above 10.Thus there was a significant correlation between HB and vitamin D deficiency and thereby low birth weight babies.

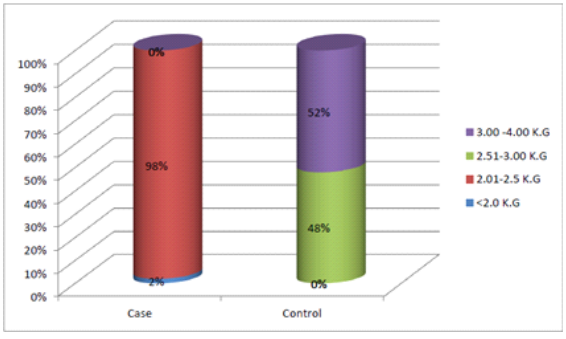


In this study there was significant association between dark complexion individuals with vitamin D deficiency and thereby low birthweight babies.88% of women in case group was found to have dark complexion compared to 44% in control group. P value <0.001% People with dark skin color produce less vitamin D because of decreased exposure to the UVB rays due to increased melanin content.



In this study vitamin D deficient individuals were found to deliver by lscs. 62% of women with vitamin D deficiency individuals underwent lscs and among control group 78% of women were found to have normal vaginal delivery.There was a significant correlation between vitamin D deficiency and delivery by lscs. P value <0.001%.The relationship of vitamin D3 with labour and delivery outcomes can thus be related to both muscle performance and uterine contractions.Thus there is found to be higher chance for delivery by lscs for women with vitamin D deficiency.According to RCOG June 2014,Vitamin D deficiency has been associated with a four fold increased risk of primary lscs.

In this study there was a significant association between vitamin D deficiency and low birth weight babies.Among vitamin D deficiency group 98% of women were found to have babies with weight between 2.01 to 2.5kg and 2% of women were found to have babies with weight less than 2kg.Among control group 48% of women were found to have babies with weight between 2.51kg to 3 kg and 52% of women were found to have babies with weight above 3 kg.P value was found to be <0.001 and found to be significant.



In this study vitamin D deficiency was found to be associated with vegetarian diet. Among cases 22% was associated with vegetarian diet compared to only 8% among control group.Low level of sreum vitamin D among pregnant mothers is found among those who consume vegetarian food alone and mix non vegetarian taking small amount of non vegetarian diet.

CONCLUSION

Based on the results from the study, it can be said that there is a significant correlation between maternal vitamin D deficiency and low birth weight baby.

The study also showed the influence of other variable like age, parity, complexion, pre pregnancy BMI, BMI at time of delivery, previous h/o low birth weight baby, diet and haemoglobin. Thus vitamin D deficiency was found to be associated with increasing age, increasing parity, dark complexion, increasing BMI and vegetarian diet. Larger studies with increased sample size and also long term effect of vitamin D supplementation are prudent.

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