DOI: https://doi.org/10.53350/pjmhs2115102829

ORIGINAL ARTICLE

Low Birthweight in Women with Vitamin D Deficiency

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ABSTRACT
Objective: to record the rate of low birth weight in pregnant women with vitamin D deficiency
Methodology: We enrolled 120 pregnant women having <30ng/mL serum level of 25(OH)D during first trimester of pregnancy. These cases were enrolled from Deptt. of Obstet & Gynaecol, Nishter Hospital, Multan. The age range was reproductive age group with any parity and 37-40weeks of gestation. The levels of 25(OH)D were evaluated through hospital laboratory whereas these cases were followed till delivery with routine treatment of Vitamin D deficiency. Birth weight of the neonate i.e. weight<2.5kg was considered as low birth weight neonates
Results: Frequency of vitamin D deficiency in low birth weight neonates was 40.83%(n=49)
Conclusion: We concluded that the frequency of low birth weight is higher among pregnant women with vitamin D deficiency.
Keywords: Pregnant women, vitamin D deficiency, low birth weight

INTRODUCTION
Vitamin D deficiency in pregnant women is considered a substantial issue worldwide.[1] Despite the widespread use of vitamins(prenatal), 5-50% of pregnant women, 10-56% breastfed infants are found with vitamin D deficiency due to inadequate maintenance of normal Vitamin D levels i.e. (≥32 ng/mL).[2] For development of fetus and, adequate levels of vitamin D in mothers is necessary. Lower vitamin D levels are associated with short gestational duration consequently inadequate growth of long bones in fetus.

The prime role of vitamin D is to maintain calcium levels and serum phosphate by promoting intestinal absorption directly; or by activating bone resorption through indirect recruitment and activation of osteoclasts.[3] Commonly in last trimester of gestation, changes in maternal calcium metabolism and vitamin D allow the transfer of upto 250mg of calcium/day to the skeleton of fetus, for a sum of 25–30 grams of calcium.[4-5] Deficiency in maternal vitamin D is associated with various adverse pregnancy outcomes, i.e. gestational diabetes, preeclampsia, small-for-gestational age and preterm birth.[6-7] Previous data reveals 13.42% of the cases with vitamin D deficiency were had low birth weight in 62.3% of the cases.[8] Another study[9] recorded 4.98% Low Birth Weight in vitamin D deficiency with pregnancy.

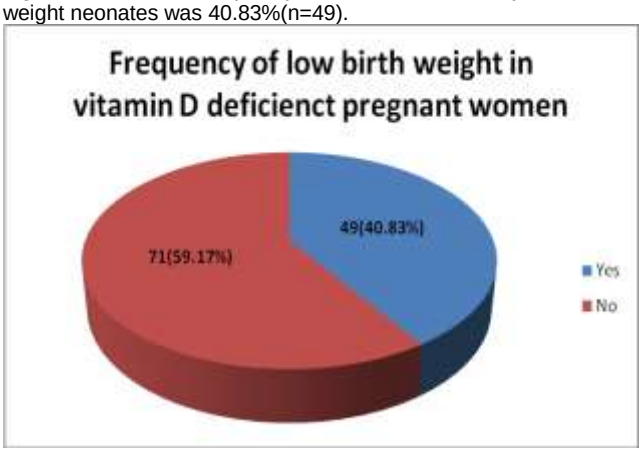
This study was planned with the view that very few studies are conducted to determine the frequency of low birth weight in pregnant women with vitamin D deficiency whereas international studies are also showing a significant variation, however the results of the current study may contribute in production of local data and also clarify the variation in international studies, and it would also be helpful for timely management of the morbidity and creating awareness regarding effect of vitamin D deficiency on neonatal birth weight.

METHODOLOGY
We enrolled 120 pregnant women having <30ng/mL serum level of 25(OH)D during first trimester of pregnancy. These cases were enrolled from Deptt. Of Obstet & Gynaecol, Nishter Hospital, Multan. The age range was reproductive age group with any parity and 37-40 weeks of gestation. Whereas those women having previous history of premature birth or low birth weight, twin/triple gestation, cervix and uterus abnormalities, other chronic health problems i.e. diabetes mellitus, hypertension, smoking, fetal or maternal infection, history of smoking and those already on treatment of Vitamin D deficiency were excluded from this trial. The levels of 25(OH)D were evaluated through hospital laboratory whereas these cases were followed till delivery with routine treatment of Vitamin D deficiency. Birth weight of the neonate i.e. weight less than 2.5kg was considered as low birth weight neonates. All the data was recorded on a pre-designed questionnaire and computed with the help of 20th version of SPSS. Age, gestational age, parity, BMI and 25(OH)D levels were calculated and presented as mean+sd. Whereas low birth weight was calculated as frequency and percentage(%).

RESULTS
Table 1:

Variables	Mean	SD
Age	29.58	6.92
BMI	28.66	5.20
G.age	38.62	3.71
Parity	3.41	2.5
25(OH) D levels	26.17	8.54

Figure 1 shows that frequency of vitamin D deficiency in low birth weight neonates was 40.83%(n=49).



In our study, mean age of the patients was calculated as 29.58+6.92 years, BMI was 28.66+5.20, gestational age was 38.62+3.71 weeks, parity as 3.41+2.5 and levels of 25(OH) D were 26.17+8.54 ng/mL. (Table 1)

DISCUSSION

It is commonly known that Vitamin D plays a pivotal role to regulate phosphorus and calcium metabolism. During gestation, bone alignment of fetus is promoted with the help of Vitamin D.[10]

In last few years, deficiency of Vitamin D is mainly due to environmental pollution and also due to dietary pattern.[11-12] Recent studies are evident that maternal Vitamin D deficiency during pregnancy may lead to adverse fetal outcome including lower childhood bone mass, small for gestational age (SGA), premature birth and low birth weight.[13-15]

Various studies focused on vitamin D deficiency relationship with low birth weight; however, these findings are inconsistent. Most of the studies concluded that maternal vitamin D levels <20ng/ml are more likely to have low birth weight new born as compared to mother with >20ng/ml of vitamin D.[16-17] Contrary to this, another study propped that Vitamin D deficiency is also associated with the higher rate of macrosomia.[18]

A Chinese nested case-control study indicated that offspring born to mothers with vitamin D deficiency had higher birth weight.[19] Zhu and colleagues, presumed that there is a “U” shaped association between maternal vitamin D deficiency and birth weight.[20] However, another trial illustrated no relationship of low birth weight with maternal vitamin D deficiency.[21]

In summary, our study computed higher rate of LBW in mother with vitamin D deficiency(severe), this hypothesis is supported with other trials. [12-14]

Jain V and others[22] are of the view that maternal sunlight exposure and 25OHD supplementation may have positive correlation with healthy infants.

Maternal 25OHD levels, infants’ vitamin supplement intake and infants’ sunlight exposure have been found to have positive correlation with the infants’ 25OHD in term healthy infants.[22] However, our study was limited to record low birth weight only, maternal vitamin D levels were quite low at birth, and are likely to have remained so during lactation, which might have contributed significantly to the deficiency state seen in infants.

CONCLUSION

We concluded that the frequency of low birth weight is higher among pregnant women with vitamin D deficiency. Our results provide a direction for the obstetricians and pregnant women to take care of Vitamin D levels since first trimester of gestation. Further local studies are also required to authenticate our findings.

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