International Journal of Contemporary Pediatrics
Tanya et al. Int J Contemp Pediatr. 2025 Aug;12(8):1414-1417
http://www.ijpediatrics.com
pISSN 2349-3283 | eISSN 2349-3291

DOI: https://dx.doi.org/10.18203/2349-3291.ijcp20252226

Case Series

The effect of hypovitaminosis D in mother on newborn babies in North India: a case series

Tanya[1]*, Agam Rai[2], Jasmine[3], Sunil S. Bains[1]

[1]Punjab Institute of Medical Sciences, Jalandhar, Punjab, India
[2]Big Data Analytics, Wroclaw University of Science and Technology, Wroclaw, Poland
[3]Department of Medicine, Aam Adami Clinic, Jalandhar, Punjab, India

Received: 02 June 2025
Accepted: 04 July 2025

***Correspondence:**
Dr. Tanya,
E-mail: tmahajan317@gmail.com

ABSTRACT

Vitamin D deficiency is a widespread concern during pregnancy across the globe. This issue can be linked to various factors, including lifestyle changes, reduced sunlight exposure, the application of sunscreen, inadequate dietary intake of vitamin D, and a lack of vitamin D supplementation during the antenatal period. Such a deficiency can affect newborns, and the symptoms can vary, complicating the diagnostic process. Only limited reports have been published on the effect of hypovitaminosis D in mothers on newborn children. We present a case series of three newborns from India who were influenced by the mother's hypovitaminosis D. In the first case the baby suffered from multiple rib fractures. In the second case the baby developed seizures and in the third case the baby was asymptomatic but suffered from refractory hypocalcemia. Due to increasing rates of vitamin D deficiency in pregnancy, a suspicion should be kept for diagnosis of hypovitaminosis and hypocalcemia in newborn with unexplained presentations.

Keywords: Hypovitaminosis, Hypocalcemia in newborn, Seizures, Multiple fractures, Refractory hypocalcemia, Case report

INTRODUCTION

Vitamin D is a fat-soluble vitamin that functions similarly to a steroid hormone. It is synthesized in the skin when exposed to ultraviolet (UV) rays or can be obtained from dietary sources. Approximately one billion people worldwide experience vitamin D deficiency or insufficiency. In India, there is a lack of comprehensive data regarding the prevalence of vitamin D deficiency during pregnancy.[1]

Vitamin D is essential during pregnancy, as indicated by the presence of nuclear vitamin D receptors (VDRs) and the enzyme 1α-hydroxylase, which activates vitamin D in pregnancy-specific tissues such as the decidua and placenta. This process facilitates calcium absorption necessary for the development of the fetal skeleton, particularly in the third trimester.[2] Vitamin D deficiency is categorized into three levels of severity: mild deficiency is defined as 25-hydroxyvitamin D levels below 20 ng/ml, moderate deficiency is characterized by levels under 10 ng/ml, and severe deficiency is indicated by levels below 5 ng/ml.[3]

Insufficient maternal vitamin D levels during pregnancy have been linked to various adverse neonatal outcomes, including being small for gestational age, preterm births, and negative effects on the development of bones and teeth in infants. Additionally, research suggests that maternal vitamin D deficiency increases the risk of respiratory infections, wheezing, and other immune-related issues in newborns, highlighting the critical importance of adequate vitamin D supplementation during pregnancy.[4]

Here, we present three cases of hypocalcemia in newborns attributed to maternal hypovitaminosis D, underscoring the necessity of vitamin D supplementation.

CASE SERIES

Case 1

A female newborn with birth weight of 3.2 kg was delivered via lower segment cesarean section to a 28-year-old G2P1L1 mother with gestation 37 weeks and six days. The baby cried immediately after birth and received routine care. The APGAR score was eight at one minute and five minutes of life. No gross congenital malformation was seen. Injection vitamin K was given at birth. Baby was shifted to the mother's side.

The mother was an unbooked case at our tertiary centre. The pregnancy was not monitored by a health professional or supplemented with any vitamins. Her viral makers were positive for HCV. She had a negative VDRL. There was an antenatal risk for infection in the baby, the cause being positive viral maker. The indication for caesarean was previous delivery with caesarean section.

Figure 1: Multiple rib fractures.

The baby was asymptomatic at birth. After 48 hours the baby developed jitteriness and was shifted to neonatal intensive care unit (NICU). On admission, the temperature of skin was 98.6°F, respiratory rate 68 breaths per minute, heart rate 130 beats per minute and oxygen saturation was 97% in room air. Baby was investigated for serum calcium and 25-hydroxy vitamin levels which revealed low levels, 6.3 mg/dl and 7.5 ng/dl respectively. The blood glucose levels were within normal limits and the septic screen was negative. To rule out other possible effects of low level of calcium and vitamin D, chest X-ray of the baby was done which showed multiple rib fractures. The baby was treated with intravenous injection of calcium and vitamin D for seven days. The prognosis of the baby was good.

According to the antenatal history which lacked monitoring, mother's serum calcium and 25-hydroxy vitamin D were investigated, showing low levels, 8.2 mg/dl and 8.2 ng/dl respectively. Hence the diagnosis of secondary hypocalcemia was made. The baby was discharged with the advice of exclusive breastfeeding and syrup osteocal 7.5 ml TDS.

Case 2

A preterm female newborn with a birth weight of 2.5 kg, delivered to a 25-year-old primigravida mother via normal vaginal delivery at 36 weeks of gestation. The baby cried immediately after birth and received routine care. The APGAR score was seven at one minute and five minutes of life. No gross congenital malformation was seen. Injection vitamin K was given at birth. Baby was shifted to the mother's side.

The mother was an unbooked case at our tertiary centre. Her native place was a village at the outskirts of Jalandhar. The pregnancy was not monitored in their village and she didn't take any multivitamins. She had negative VDRL and viral makers. There was no antenatal risk for sepsis in the baby. The baby showed no symptoms at birth. On the 4th day of life, the baby developed seizures, four-five episodes. The blood samples were sent for calcium, phosphorus and 25-hydroxyvitamin D. The reports showed decreased levels 6.3 mg/dl, 114 U/l and 10.2 ng/dl respectively.

Mother's serum levels of calcium and 25-hydroxy vitamin D were 9 mg/dl and 14.7ng/dl respectively. Her serum phosphorus was 10.2 mg/dl. Thus, with the evidence of hypocalcemia, low vitamin D levels along with maternal hypovitaminosis, the diagnosis of hypocalcemia seizures secondary to maternal hypovitaminosis D was made. The baby was treated with intravenous calcium and vitamin D for eight days. The baby responded well to the treatment. The serum calcium and vitamin D levels normalised and the baby was discharged on injection calconax 7.5 ml TDS for one month along with exclusive breastfeeding.

Case 3

A preterm male newborn with a birth weight of 3.6 kg, delivered to 35-year-old G4P3L3 mother with chronic hypertension and diabetes mellitus via lower segment cesarean section at 34 weeks+ three days. The APGAR score was six at one minute and seven at five minutes of life. The baby cried on stimulation and started grunting at

birth. The baby received routine care. The baby also had grunting at birth. No gross congenital malformation was seen. Injection vitamin K was given at birth. Baby was shifted to the neonatal intensive care unit (NICU) in view of macrosomia, delayed crying and respiratory distress. On admission the skin temperature was 98.4°F, respiratory rate 70 breaths per minute with subcostal retractions, heart rate 145 beats per minute and oxygen saturation was 84% in room air.

The baby was managed with continuous positive airway pressure (CPAP) for 48 hours, intravenous fluids and orogastric feed. The blood glucose level was normal. The baby had no symptoms of hypovitaminosis. When the routine samples of serum electrolyte were sent on the third day of life baby the results verified hypocalcemia (5.8 mg/dl) and insufficient 25-hydroxy cholecalciferol (14 ng/dl), sepsis screen was positive with CRP (10.2 mg/dl). The treatment with antibiotics was upgraded, hypocalcemia and hypovitaminosis D was managed with intravenous calcium and vitamin D.

Furthermore, to get to know the cause of deranged calcium and vitamin D levels in the baby, detailed antenatal history was taken which disclosed that the mother did not take any multivitamins supplementation and medications for hypertension and diabetes. On investigations, the mother's serum calcium was at borderline level (8 ng/dl) and 25-hydroxy vitamin D was insufficient (12 ng/dl).

However, the baby did not respond to treatment and hypocalcemia persisted. Thus, the diagnosis of refractory hypocalcemia was made. Hence addition of magnesium injections was done for five days. The levels started raising with good prognosis. The baby was discharged on request of parents with instructions of exclusive breastfeeding, syrup calcimax five ml BD and myriad drops one ml OD.

DISCUSSION

Vitamin D deficiency is a significant global health concern, particularly during pregnancy and the postpartum period. Recent studies highlight its crucial role not just during pregnancy but also before conception, as it can impact fertility. This deficiency is especially prevalent among pregnant women across all trimesters. In the early stages of pregnancy, 25(OH) D is transferred from the mother to the fetus through the placenta, and the levels found in umbilical cord blood at birth typically reflect about 80% of the mother's levels. Additionally, vitamin D is known to enhance innate immunity by reducing the production of antimicrobial peptides.

When assessing this deficiency, it's important to consider lifestyle factors in conjunction with vitamin D supplementation. Research shows that elements such as limited sun exposure, indoor lifestyles, clothing choices, sunscreen application, dietary patterns, skin pigmentation, and certain health conditions can significantly influence the body's ability to produce and absorb vitamin D.5,6 People with darker skin are at a greater risk because melanin reduces the absorption of UVB rays, which are crucial for vitamin D production. Additionally, exclusively breastfeeding without giving vitamin D supplements increases the risk of vitamin D deficiency in newborns and infants.[7]

A report by Mallick et al showed the symptoms of tonic-clonic seizures in the baby born to a hypovitaminosis mother on the sixth day of life but in comparison to our cases there were no multiple rib fractures, no hypomagnesemia, no diabetes mellitus and sepsis.

Pandya et al, considered three cases among infants of Afghani mothers living in the UK, where cultural lifestyle restricting sun exposure had resulted in maternal hypovitaminosis D, resulting in neonatal seizures, hypocalcemia, and rickets. Their work strongly promoted antenatal vitamin D screening in at-risk populations.8 Your case series, on the other hand, looks at newborns in North India and reports cases of neonatal hypocalcemia, such as multiple rib fractures and resistant hypocalcemia.

It points to food habits, socioeconomic status, and absence of prenatal supplementation as major factors causing maternal vitamin D deficiency. Although both studies underscore the importance of vitamin D in neonatal calcium homeostasis and bone growth, your case series offers a wider view by incorporating other maternal health variables like hypertension, diabetes, and access to antenatal care.

To our knowledge no case series is published in India regarding the effect of hypovitaminosis in the mother on the newborn. Fortunately, the adverse effects are avoidable if the mother receives vitamin D supplementation during pregnancy and during early lactation.9 A recent study indicated that a daily intake of 4000 IU of vitamin D is crucial for supporting normal metabolism during pregnancy. This dosage has proven to be both effective and safe, with no toxic effects observed in either the mother or the newborn.[10]

CONCLUSION

These cases provide compelling evidence that a lack of vitamin D in mothers can affect their newborns. Our research indicates that infants born to mothers with low vitamin D levels face an increased risk of various health issues. These findings underscore the importance of routine screening and vitamin D supplementation for expectant mothers to ensure optimal health for both them and their babies.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: Not required

REFERENCES

1. Sizar O, Khare S, Goyal A, Givler A. Vitamin D deficiency. 2023.
2. Dragomir RE, Toader DO, Gheoca Mutu DE, Dogaru IA, Răducu L. Consequences of maternal vitamin D deficiency on newborn health. Life. 2024;14(6):714.
3. Sonowal R, Das M, Deka BP, Das P. Effects of maternal vitamin D deficiency on the newborn: a cohort study. Indian J Neonatal Med Res. 2021;9(2):2319.
4. Karras SN, Fakhoury H, Muscogiuri G, Grant WB, van den Ouweland JM, Colao AM, Kotsa K. Maternal vitamin D levels during pregnancy and neonatal health: evidence to date and clinical implications. Ther Adv Musculoskelet Dis. 2016;8(4):124-35.
5. Roomi MA, Farooq A, Ullah E, Lone KP. Hypovitaminosis D and its association with lifestyle factors. Pak J Med Sci. 2015;31:1236-40.
6. Mansur JL, Oliveri B, Giacoia E, Fusaro D, Costanzo PR. Vitamin D: before, during and after pregnancy: effect on neonates and children. Nutrients. 2022;14(9):1900.
7. Mallick AK, Yadav RK, Sannalli K, et al. Maternal hypovitaminosis D presenting as late-onset hypocalcemic seizure in a term neonate: a case report. Egypt Pediatric Association Gaz. 2023;71:15.
8. 8Pandya A, Aldouri A, Pandya N, Bhaduri B. A case series of vitamin D deficiency in mothers affecting their infants. Infant J. 2010;6(6):196-200.
9. Camadoo L, Tibbott R, Isaza F. Maternal vitamin D deficiency associated with neonatal hypocalcaemic convulsions. Nutr J. 2007;6:23.
10. Al Emadi S, Hammoudeh M. Vitamin D study in pregnant women and their babies. Qatar Med J. 2013;2013(1):32-7.

Cite this article as: Tanya, Rai A, Jasmine, Bains SS. The effect of hypovitaminosis D in mother on newborn babies in North India: a case series. Int J Contemp Pediatr 2025;12:1414-7.