POSTPARTUM VITAMIN-D DEFICIENCY AND ITS RELATIONS WITH SOCIODEMOGRAPHIC FACTORS

ABSTRACT:

Background: Deficiency of Vitamin D or 25(OH) cholecalciferol is a severe health problem worldwide. Vitamin D is essential for calcium and bone metabolism and protects against various autoimmune disorders, cardiovascular diseases, chronic infections, cancers, and infertility. It also plays a vital role in pregnancy. During pregnancy, the fetus acquires their vitamin D from their mother and r the first few months of life after delivery, particularly in breastfed infants. Deficiency of Vitamin D in infants can lead to rickets, respiratory infections, allergic diseases, heart failure. **Aims and objective**: To investigate the prevalence of vitamin D deficiency in the postpartum period and to study its relation with the sociodemographic characteristics of the patients. **Material and Methods**: This was cross-sectional observational study was conducted over one year. Sociodemographic characters and serum concentrations of vitamin D in the 25(OH)D were compared. **Results**: To a total of 550 patients were enrolled. The mean age of patients was 26.5 years, around 58% of patients were from the peri-urban area, maximum number of patients were primiparous. Around 90% of patients did not have any sun exposure on a regular basis. Around 59% of enrolled patients were either unbooked or had only one antenatal visit. The mean plasma concentration of 25(OH)D in postpartum patients was 27.6ng/mL. No association was found between sociodemographic factors studied and vitamin D concentration. **Conclusion**: This study showed the higher prevalence of vitamin D deficiency in India's postpartum patients despite having abundant sunlight and identifies the need for supplementation of vitamin D in pregnancy and postpartum. This supplementation has to be followed routinely in hospitals in obstetric management protocol.

Keywords: Vitamin-D, Post-partum, Deficiency,

INTRODUCTION

Deficiency of Vitamin D or 25(OH) cholecalciferol, is a severe health problem all over the world, affecting around 1 billion people ((1,2). Vitamin D is not only important for calcium and bone metabolism but also recognized as important factor for protecting against various autoimmune disorders, cardiovascular diseases, chronic infections, cancers and even infertility(3,4). In pregnancy, vitamin D concentration increases by some unrecognised mechanism to provide adequate calcium supply to developing fetus(5,6). It also plays important role as pregnancy advances, because its deficiency can lead to preeclampsia, gestational diabetes, preterm birth, intrauterine fetal growth restriction(5,7–9). During pregnancy, fetus acquires their vitamin D from their mother, and this forms the main source of vitamin D for first few months of life after delivery, particularly in breast fed infants (10). Deficiency of Vitamin D in infants can lead to rickets, respiratory infections, allergic diseases, heart failure(11–13). Synthesis of vitamin D occurred endogenously in the skin by exposure of Ultraviolet B radiation (UVB) of sunlight but it is also affected by many factors like nutritional status, fat composition of the diet, vitamin and minerals supplements, frequency of sun exposure, color of skin, application of sun protecting emollients on exposed skin(14).Therefore in countries with high sun exposure like India, prevalence of deficiency of vitamin D is very high. The mean prevalence rate of vitamin D deficiency in India in overall population is around 70-90%, including pregnant women and their infant(15). Vitamin D content of breastmilk directly correlates with 25(OH)D status of mother, thus nutritional requirement of vitamin D in breastfed infants will not be fulfilled if mother is vitamin D

deficient, affecting the health status of neonate(16).Currently, large number of literature points towards deficiency of vitamin D and its effects on pregnancy and fetus but to date no recommendation has been made for supplementation of vitamin D in pregnancy or in postpartum period. Due to limited number of studies that evaluated the serum vitamin D levels in puerperium period, we had carried out a study for evaluating the vitamin D concentration in the postpartum period and its relation with sociodemographic characteristics.

AIMS AND OBJECTIVE:
To investigate the prevalence of vitamin D deficiency in postpartum period and to study its relation with the sociodemographic characteristics of the patients.

MATERIAL AND METHODS:
This was the cross-sectional observational study, conducted in the OBS-GYN department of the Datta Meghe Medical College and Shalinitai Meghe Hospital and Research centre, Nagpur, in collaboration with Jawaharlal Nehru Medical College, Wardha. Enrolment of the patients were done from 1st April 2020 to 31st March 2021, over a period of 1 year duration.
Inclusion criteria:

- All patients who delivered in the obstetric ward of the hospital during the study duration and willing to give consent
- Patients with gestational age >37+0 weeks at the time of delivery

Exclusion criteria:

- Patients not willing to give consent
- Patients with gestational age<36+6 weeks at the time of delivery
- Patients having endocrinological, rheumatological and renal disorder
- Patients on medications like diuretics, antihypertensive or steroids, which interfere with the metabolism of vitamin D

All the patients included in the study were screened as per inclusion and exclusion criteria. Informed consent were taken and they were explained that their data will be used for research purpose without breaching their confidentiality and course of management. Detailed history was taken, including age, parity, education, job profile and other sociodemographic characters. Blood sample was drawn from 48-72 hours post delivery and serum concentrations of vitamin D in form of 25(OH)D measured. Deficiency of vitamin D is defined as serum 25OHD <50 nmol/L. It can be classified as moderate when serum concentration goes below 25 nmol/L and severe when it further lowers below 12.5 nmol/L.(17)

RESULTS:
In our study, we had total 968 deliveries during the study period and total 550 cases were enrolled as per inclusion and exclusion criteria. Out of total enrolled cases, there was 278 cases delivered by caesarean section and rest of the patients i.e. 272 had vaginal delivery. Mean age of patients were 26.5 years with range from 18 years to 36 years. Around 58% patients were from peri urban area, and 42% cases were from rural area. Maximum patients were primiparous (386 patient i.e.59.38%). Maximum patients had completed their secondary school board education but most of the patients were housewives (64.92%). Patients which were working or doing job had their work in the company/ factories or doing house chores. Only few patients had outside or field work (70 cases). Around 90% patients did not have any sun exposure on regular basis. Around 59% enrolled patients were either unbooked or had only one antenatal visit. The mean plasma concentrations of 25(OH)D in postpartum patients was 27.6ng/mL with a range from 8.2ng/mL to 56.4ng/mL.

Table no.1 Vitamin D concentration

			vitamin	**D**	**concen**	**tration**
Variables		No. of patients	>50nmol/L (12)	25-50 nmol/L (256)	25-12.5 nmol/L (230)	<12.5 nmol/L (52)
Age:	=<25 years 25-35 years >35 years	178 292 80	7 4 1	121 132 3	35 126 69	15 30 7
Parity	Primi Multi parous	386 164	10 2	148 108	110 120	16 36
Education	Less than 10th Till graduation Postgraduation	104 410 36	4 6 2	50 186 20	25 197 8	25 21 6
Working	Nonworking Working: Indoor activity: Outdoor activity:	357 123 70	6 2 4	128 86 42	186 23 21	37 12 3
Residence	Periurban: Rural:	319 231	4 8	118 138	169 61	28 24
Antenatal visits	Booked: Unbooked:	226 324	10 2	140 116	54 176	22 30
Type of delivery	Vaginal delivery: Cesearean section:	272 278	5 7	126 130	113 117	28 24

DISCUSSION:

Till date, in present literature, very few studies have evaluated the levels of vitamin D in postpartum patients. Though multifunctional role of vitamin D in pregnancy and infant development has been proved, little attention has been given towards the protocol of vitamin D supplementation in antenatal as well postnatal period. In our study the prevalence of vitamin D deficiency in postpartum patients is very high i.e. 97.8%, which is of great concern for mother and neonatal health. Similarly, in the study of Martin et al, prevalence of vitamin D insufficiency was 74%(18)and in the study of K. I. Mohammad, et al, deficiency and insufficiency of vitamin D was seen in 76% and 24% respectively in puerperae (19).This high prevalence of vitamin D deficiency in our Indian study, despite India being in the tropical zone, may be due to lower body exposure to sun due to traditional and modest pattern of clothing covering almost whole body, less outdoor activity, dietary calcium deficiency, and skin pigmentation. In a country like India, where sunlight is of no concern and it is uniform and abundant almost throughout the year, no seasonal variation has been seen in our study. Whereas in some studies, especially those from European countries, had shown seasonal variation of vitamin D, with lower concentrations of vitamin D during winter(20,21). Maximum patients in our study were from age group 25-35 years, primiparous and non working women. Similar demographic features were seen in the study of Martin et al(18). Various sociodemographic variables included in our study were compared with the different levels of vitamin D concentration but none of the variables showed association with the vitamin D levels. In our study, vitamin D deficiency did not have any significant difference among the patients when they were categorised by either age, parity, residence, working status, booked or unbooked. Our study did not show any significant association between

vitamin D concentration and sociodemographic variables but it definitely proves the higher prevalence of vitamin D deficiency in postpartum patients and emphasizes the need for urgent intervention. In a systematic review by Saraf et al, the prevalence of vitamin D deficiency was 54% in pregnant women and 75% in newborns(22), thus propagating the urgent need for public health intervention. Many studies reflect on the pregnancy related complications (23-26), role of different vitamins in specified health related issues (27-30) and post-partum healthcare and awareness needs(31-32) of women in India .

CONCLUSION

This study showed the higher prevalence of deficiency of vitamin D in postpartum patients of India despite having abundant sunlight. This low concentration of vitamin D was not associated with the sociodemographic factors, studied. Further studies are required to identify the various risk factors for vitamin D deficiency and to evaluate its effect on pregnancy outcome and neonate. However, our study identifies the need of supplementation of vitamin D in pregnancy and postpartum and to be followed routinely in hospital protocol of obstetric management.

Ethical Approval:

As per international standard or university standard written ethical approval has been collected and preserved by the author(s).

Consent

As per international standard or university standard, patients' written consent has been collected and preserved by the author(s).

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