Study of Biochemical Parameters Mothers and Neonates in Cigarette Smoke Exposure on Vitamin D Level in Vidharbha Region

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Abstract

Introduction: Vitamin D is a nutrient that is needed for bone growth and processing. Vitamin D and calcium are extremely important during certain stages of life, such as the baby's development, childhood, childhood and adolescence, breastfeeding, lactation, and old age. Vitamin D and calcium deficiency have severe implications at this time. **Aim:** Study Of Biochemical Parameters Mothers And Neonates In Cigarette Smoke Exposure On Vitamin D Level In Vidharbha Region **Material and Methods:** Both pregnant non-smoker women who were referred to Shalinitai Meghe hospital and Research center Consequently, Nagpur was hired for distribution on the basis of their reports; 54 subjects were exposed to tobacco smoke and 54 subjects were not exposed. **Result:** Status and metabolic parameters of maternal vitamin D With no important difference in both the uncovered and exposed categories, we find a low level of 25 vit (D) (OH) (depending on the level of urinary cotinine). (> 0.0113 p total) (8.71 4.33 ng / ml vs. 11.02 4.96 ng / ml).(See Table 1) Based on self-reported exposure, maternal serum calcium levels were lower in exposed populations than in untreated sub-jects (p = 0.001). There was a substantial variation between the groups in serum phosphorus levels. Based on independent expression, alkaline phosphatase levels in the articulated group were found to be higher than in the other group (p = 0.0129).**Conclusion :** The findings showed that second hand smoke consumption had a detrimental effect on pregnant women. In songs and babies, serum vitamin D levels were not substantially different between the two classes, but were lower in exposed persons.

Key Words: *Cigarette smoke exposure, Pregnancy, 25-hydroxy vitamin D, Biochemical parameters.*

Introduction

Vitamin D is a nutrient that is needed for bone growth and processing. Vitamin D and calcium are extremely important during certain stages of life, such as the baby's development, childhood, childhood and adolescence, breastfeeding, lactation, and old age. Vitamin D and calcium deficiency have severe implications at this time.[1] During pregnancy, major changes in the metabolism of vitamin D, calcium, and parathyroid hormones occur in order to provide the calcium required for fetal and bone development, especially in the last trimester of pregnancy. [2]

Diet, alcohol, and caffeine consumption, sun exposure, skin pigmentation, obesity, exercise, clothing, and seasonal variations can all affect vitamin D status and bone metabolism during pregnancy. In recent years,

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the emphasis on smoking during breastfeeding has allowed certain individuals to smoke at home, at work or in public areas. People in Iran are smoking in their households (41.7%) and not at home (50.6 %). 97.4% of female smokers have been reported to be exposed during breastfeeding to second-hand smoke. Cigarette smoke toxicity Smoking during pregnancy can lead to complications such as unintended pregnancy, low birth weight, placental abruption, premature intestine rupture, intrauterine growth, and uterine bleeding. Smoking during pregnancy in both the maternal and fetal bones may lead to bone turnover and contribute to weight loss.[3]

Vitamin D deficiency was observed for mothers (66.8 %) and babies (93.3 %) in Iran. Several studies have been performed on the impact of smoking on bone metabolism, vitamin D 25-hydroxy status, and the parathyroid hormone function during pregnancy, most of which have been investigated by female smokers. No experiments have been undertaken to examine the effect of non-smoking on vitamin D and chemical controls on the mechanisms of birth mothers and babies.[4]

Because of the effect of vitamin D on the turnover of bones and the fetal growth status of pregnant women and their children, as well as the possibility of deficiency of vitamin D. This research was intended to determine the effect of exposure to tobacco in mothers and babies at birth on vitamin D levels and the PTH organ.[5]

Maternal nutrition status is the most significant determinant of the nutritional status of a newborn and other maternal wellbeing and fertility outcomes. An avoidable but popular complication is a low cycle of 25 hydroxyvitamin D (25 (OH) D) during pregnancy. Vitamin D's effectiveness in the prevention of health and illness includes effects on hormonal pathways, immune system development and inflammation, and cell proliferation and differentiation. Furthermore, vitamin D is important for the growth and maintenance of the skeletal system through calcium metabolism. Pregnant mothers (25), neurodevelopment, and lung development all have poor ratios. Hey. Growth. 25 levels (OH) D are required during pregnancy for the wellbeing of the mother, fetus and infant. Maternal levels of vitamin D are determined largely during pregnancy by maternal levels of vitamin D. As a result, low levels of 25 (OH) D at birth have a significant influence on neonatal levels of 25 (OH) D and lead-based health effects. In people with asthma, blood levels of 25 (OH) D during breastfeeding have been shown to be low.[6,7]

The factors associated with 25 (OH) D levels in multiple pregnancies have been explored in various studies. Sunlight, cholecalciferol skin development due to ultraviolet (UV) radiation B, one of the main contributors to circulating 25 (OH) D levels, and seasonal blood with elevated serum levels have all been related to 25 (OH) D levels during pregnancy.[8]

In addition, low levels of 25 (OH) D are very normal in non-white people and in those with high melanin pigmentation, where bias has been shown to be a significant risk factor in a previous analysis of vitamin D deficiency or deficiency. **9**

Maternal smoking and alcohol intake, low levels of literacy, and general inadequate diet and vitamin D supplementation are other causes correlated with low 25 (OH) D levels in pregnancy.[10]

Aim: Study of Biochemical Parameters Mothers And Neonates In Cigarette Smoke Exposure On Vitamin D Level In Vidharbha Region

Material and Method

Both pregnant non-smoker women who were referred to Shalinitai Meghe hospital and Research center Consequently, Nagpur was hired for distribution on the basis of their reports; 54 subjects were exposed to tobacco smoke and 54 subjects were not exposed. Patients went directly to the Observed Treatment Short-course focus in the Dept. of OBGY, Datta Meghe Medical College and Shalinitai Meghe Hospital and Research Center, Nagpur in collaboration with JNMC & ABVRH (Datta Meghe Institute of Medical Sciences Deemed To Be University), Sawangi, Wardha, Maharashtra.

Sample Collection:

5ml of each patient's blood sample was taken and separated into plain tube. The sample was used to estimate the levels of Serum Vit-D, PTH, Calcium, Phosp, Alkp, etc.

Inclusion Criteria:

1. From 38 to 40 weeks of gestational age

Exclusion Criteria:

1. Culture of nicotine use in mothers

2. Chronic diseases, such as granulomatous disease, have serious complications, high blood pressure

3. diabetes

4. Hyperparathyroidism

5. thyroid dysfunction

6. kidney disease

7. liver or any incurable disease

Result

Table 1 Vitamin D and other biochemical factors of maternal serum (mean ± SD) Cigarette smoke exposure status Based on maternal reports (ng/ml)

Variable	Exposed (n = 54)	Non-exposed (n = 54)	p value
25- hydroxy vitamin D (ng/ml)	8.71 ± 4.33	11.02 ± 4.96	0.0113
Calcium (mg/dl)	8.43 ± 0.64	9.04 ± 0.72	0.0001
Parathyroid (pmol/l)	1.52 ± 0.96	1.82 ± 1.49	0.2163
Phosphorous (mg/dl)	4.22 ± 0.80	4.00 ± 0.93	0.1904
Alkaline phosphatase (IU/l)	412.26 ± 107.44	356.28 ± 122.48	0.0129

Status and metabolic parameters of maternal vitamin D With no important difference in both the uncovered and exposed categories, we find a low level of 25 vit (D) (OH) (depending on the level of urinary cotinine). (> 0.0113 p total) (8.71 4.33 ng / ml vs. 11.02 4.96 ng / ml).

(See Table 1) Based on self-reported exposure, maternal serum calcium levels were lower in exposed populations than in untreated sub-jects (p = 0.001). There was a substantial variation between the groups in serum phosphorus levels. Based on independent expression, alkaline phosphatase levels in the articulated group were found to be higher than in the other group (p = 0.0129).

Table 2 : Vitamin D and other biochemical factors of umbilical cord serum (mean ± SD)

Cigarette smoke exposure status

Based on maternal reports

Variable	Exposed (n = 54)	Non-exposed (n = 54)	p value
25-hydroxy Vit-D (ng/ml)	11.73 ± 5.92	11.90 ± 5.04	0.872
Calcium (mg/dl)	9.96 ± 0.82	10.54 ± 0.79	0.0003
Parathyroid Hormone (pmol/l)	0.30±0.26	0.36±0.29	0.260
Phosphrous (mg/dl)	6.26 ± 0.82	6.47 ± 0.93	0.216
Alkaline phsphatase (IU/l)	402.20 ± 129.25	372.33 ± 118.4	0.213

Disease in Children's Levels of Vitamin D and Biological Chemicals In infants, vitamin D levels were above the normal absence range. In the exposed population, the concentration of 25-hydroxy vitamin D in cord serum was lower (11.73 5.92 ng/ml vs. 11.90 5.04 ng/ml, p> 0.872). There were no major variations in calcium, parathyroid hormone, phosphorus, or alkaline phosphatase levels between the two 25 (OH) D levels (Table 2).

In both revealed and unidentified subjects, there was a substantial link between the amount of 25-hydroxy vitamin D in maternal serum and umbilical cord serum.

Discussion

In a sample of pregnant and non-smokers in Spain, according to our results, the diagnosis of 25-hydroxyvitamin D in maternal and body serum smokers was found not to be substantially lower. [11] Vitamin D deficiency induces a decline in intestinal calcium synthesis, lowering serum calcium [12]. In both classes, vitamin D levels were lower, followed by a substantial drop in serum calcium levels in the persons affected. This discovery may be due to direct interaction with nicotine products, including calcium receptors, leading to a decline in the consumption of intestinal calcium and, subsequently, a decrease in the amount of calcium.

Reduced serum calcium levels can be the result of elevated levels of parathyroid hormone and alkaline phosphatase found in exposed persons. Increased parathyroid hormone levels contribute to a rise in available revenue, leading to higher serum alkaline phosphatase concentrations. In a cohort study looking at higher levels of parathyroid hormone in smokers than in non-smokers, similar results were published..[13]

Other studies have shown that a drop in serum vitamin D levels is related to a decrease in para-thyroid hormone levels and a rise in serum phosphorus. The parathyroid glands may have a function to prevent this gland from developing. [14]

Such reports contradict the results of a recent report. Both of these complications have been related to new findings on vitamin D deficiencies in pregnant women and a shortage of vitamin D in their diet. In the established category, these deficiencies were important. A widespread vitamin D deficiency has been discovered in various studies.[15]

In Vidharbha, pregnant men and women. There are many confounding factors in reducing vitamin D that are effective. In our study, vitamin D deficiency was observed in both classes, but it was not possible to determine the impact of smoking on vitamin D levels. [16]

Vitamin D deficiency in newborns is due to the amount of vitamin D in the placenta, and poor birth rates and vitamin D deficiency in mothers are linked to vitamin D deficiency in infants. The current study's results reinforce this organization; serum levels of 25-hydroxyvitamin D in mothers and babies in both exposed and non-exposed populations indicate a strong connection.[17]

The levels of 25-hydroxy vitamin D, calcium, parathyroid and phosphorus hormones and serum alkaline phosphatase in the navel are not substantially different in both classes. Gomez and colleagues reported major variations between groups for serum 25-hydroxyl vitamin D, parathyroid hormone and umbilical cord phosphorus levels. There were lower levels of parathyroid hormone and 25-hydroxyl vitamin D and higher levels of phosphorus in female smokers. Poor parathyroid hormone levels in this sample in the bloodstream of all neonates It may arise from higher levels of calcium in the umbilical cord than in mothers. If the overall consumption of calcium rises, the volume of ionized calcium will also rise. Ionized calcium levels in the fetal blood are slightly lower than in the mother. Our analysis calculated parathyroid hormone levels using the amino terminal system (N-terminal) as a restriction. In this point, the parathyroid level of the cords may be very small and maybe not detectable.[18]

Conclusions

The findings showed that second hand smoke consumption had a detrimental effect on pregnant women. In songs and babies, serum vitamin D levels were not substantially different between the two classes, but were lower in exposed persons. This decreased reduction led to lower calcium levels and higher serum levels of parathyroid hormone and alkaline phosphatase in the specified group of mothers and babies. The effects

of cigarette smoke on vitamin D concentrations and chemical limits in pregnant mothers, passive smokers and their fetuses were analyzed in other small studies. These studies recommend steps to minimize exposure to nicotine during pregnancy and to improve the use of vitamin D and calcium supplements during pregnancy, taking into account the risk to women during this crucial time of life and the effects on the well-being of the infant.

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References

1. Holick MF. High prevalence of vitamin D inadequacy and implications for health. Mayo Clin Proc. 2006 Mar; 81(3):353-73.
2. Schoenmakers I, Goldberg GR, Prentice A. Abundant sunshine and vitamin D deficiency. Br J Nutr. 2008 Jun; 99(6):1171-3.
3. Banihosseini SZ, Baheiraei A, Shirzad N, Heshmat R, Mohsenifar A. The effect of cigarette smoke exposure on vitamin D level and biochemical parameters of mothers and neonates. J Diabetes Metab Disord. 2013;12:19. Published 2013 May 11. doi:10.1186/2251-6581-12-19
4. Mulligan Megan L, Felton Shaili K, Riek Amy E, Bernal-Mizrachi C. Implications of vitamin D deficiency in pregnancy and lactation. Am J ObstetGynecol. 2009;201:1–9. doi: 10.1016/j.ajog.2009.05.043.
5. Bowyer L, Catling-Paull C, Diamond T, Homer C, Davis G, Craig M. Vitamin D, PTH and calcium levels in pregnant women and their neonates. Eclin Endocrinol (Oxf). 2009 Mar; 70(3):372-7.
6. Jensen ME, Camargo CA Jr, Harvey SM, Gibson PG, Murphy VE. Serum 25 Hydroxyvitamin D Levels During Pregnancy in Women with Asthma: Associations with Maternal Characteristics and Adverse Maternal and Neonatal Outcomes. Nutrients. 2020 Sep 29;12(10):2978.
7. Madar, A.A.; Stene, L.C.; Meyer, H.E. Vitamin D status among immigrant mothers from Pakistan, Turkey and Somalia and their infants attending child health clinics in Norway. Br. J. Nutr. 2009, 101, 1052–1058.
8. Díaz-Gómez, N.M.; Mendoza, C.; González-González, N.L.; Barroso, F.; Jiménez-Sosa, A.; Domenech, E.; Clemente, I.; Barrios, Y.; Moya, M. Maternal smoking and the vitamin D-parathyroid hormone system during the perinatal period. J. Pediatr. 2007, 151, 618–623.
9. Vandevijvere, S.; Amsalkhir, S.; Van Oyen, H.; Moreno-Reyes, R. High prevalence of vitamin D deficiency in pregnant women: A national cross-sectional survey. PLoS ONE 2012, 7, e43868.
10. Luque-Fernandez, M.A.; Gelaye, B.; VanderWeele, T.; Ferre, C.; Siega-Riz, A.M.; Holzman, C.; Enquobahrie, D.A.; Dole, N.; Williams, M.A. Seasonal variation of 25-hydroxyvitamin D among non-Hispanic black and white pregnant women from three US pregnancy cohorts. Paediatr. Perinat. Epidemiol. 2014, 28, 166–176.
11. Diaz-Gomez N, Mendoza C, González-González N, Barroso F, Jiménez-Sosa A, Domenech E, Clemente I, Barrios Y, Barrios Y, Moya M: Maternal smoking and the vitamin D-parathyroid hormone system during the perinatal period. Pediatr 2007, 151:618–623.
12. Fauci AS, Braunwald E, Kasper DL, Hauser SL, Longo DL, Jameson JL, Loscalzo J: Harrison's principles of internal medicine. 17th edition. New York: McGraw-Hill Professional; 2008:2376.
13. Szulc P, Garnero P, Claustrat B, Marchand F, Duboeuf F, Delmas P: Increased bone resorption in moderate smokers with low body weight: the Minos study. J ClinEndocrinolMetab 2002, 87:666–674.
14. Jorde R, Saleh F, Figenschau Y, Kamycheva E, Haug E, Sundsfjord J: Serum parathyroid hormone (PTH) levels in smokers and non-smokers. The fifth Tromsø study. Eur J Endocrinol 2005, 152:39–45.
15. Ambad R et al. To Assess the Serum Vitamin D in Vitiligo Patients: SMHRC and AVBR Hospital of Vidarbha Region. Indian Journal of Forensic Medicine & Toxicology, October-December 2020, Vol. 14, No. 4; 7132-7135.
16. Hashemipour S, Larijani B, Adibi H, Javadi E, Sedaghat M, Pajouhi M, Soltani A, Shafaei AR, Hamidi Z, Fard AR, Hossein-Nezhad A, Booya F: Vitamin D deficiency and causative factors in the population of Tehran. BMC Public Health 2004, 4:1–6.
17. Juneja S, Dangore-Khasbage S, Bhowate RR. Role of vitamin d in prevention of corona virus infection

(Covid-19). Int J Res Pharm Sci 2020;11(Special Issue 1):407-410.Kamble A, Ambad RS, Padamwar M, Kakade A, Yeola M. To study the effect of oral vitamin d supplements on wound healing in patient with diabetic foot ulcer and its effect on lipid metabolism. Int J Res Pharm Sci 2020;11(2):2701-2706.