



ASSOCIATION OF TSH AND 25-HYDROXYVITAMIN D IN PREGNANT WOMEN: A CROSS SECTIONAL STUDY

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ABSTRACT

Aim: This study is conducted with the aim to see any correlation between vitamin D and TSH levels during pregnancy.

Method: A total of 86 pregnant women were included during the period of July to August 2020. Serum vitamin 25(OH)D and TSH were measured by chemiluminescent method.

Results: We included pregnant women age ranged from 19-35 years. The mean \pm SD of 25(OH) D and TSH was 18.01 ± 4.5 ng/ml (range 8.0 to 31.2) and 1.69 ± 1.21 mIU/ml respectively. Vitamin D deficiency, insufficiency and sufficiency were found in 66.7%, 31% and 2.2% females, respectively. No correlation was found between vitamin D and TSH in pregnant females. ($p > 0.05$)

Conclusion: We found no significant correlation between TSH and 25-Hydroxyvitamin D in pregnant females.

KEYWORDS : 25-Hydroxy vitamin D, Thyroid stimulating hormone (TSH), Hypovitaminosis D

INTRODUCTION:

Hypovitaminosis D is a public health problem in majority of countries.^[1,2] It plays an important role in bone development and calcium homeostasis. It is also essential for fetal health, growth and development.^[1] Hypovitaminosis D in pregnancy is a public health problem.^[3] Recent studies have shown that hypovitaminosis D leads to unfavourable outcomes in pregnant females and in their offspring. For this reason these pregnant women have been now classified into high-risk group.^[1]

Many researchers have proved the role of vitamin D in the regulation of pro-inflammatory cytokines, regulatory T cell, and immune response.^[4] They found that vitamin D deficiency leads to an increase in the risk of autoimmune diseases. Vitamin D also involve in the pathogenesis of DCs cells, macro-phage, CD4 + T, CD8 + T, and B cells in development of immunity.^[5,6] Besides, it act as selective immune inhibitor that plays an important role in suppressing and preventing the development of autoimmune diseases such as rheumatoid arthritis, type 1 diabetes, systemic lupus erythematosus and intestinal inflammatory diseases and encephalopathy.^[7-9]

Furthermore, as hypovitaminosis D was linked to a variety of different health problems, Therefore understanding of vitamin D supplementation is vital to reduce risk on mother and fetus.

Vitamin D is fat soluble vitamin and mainly synthesis in cutaneous tissues via exposure to sunlight and dietary intake contributed to very low percentage (5%).^[10] It is stored in adipocytes and liver.^[10] Vitamin D status in a person depends on many factors such as, dietary habits, race/ethnicity, cultural and religious factors, smoking, sunscreen use, body mass index, education, geographic zone and season.^[11,12]

There is high prevalence of vitamin D deficiency in pregnancy. Many evidences have shown that there is link between vitamin D and thyroid hormone as both functions through similar receptors.^[13] Thyroid disorder and hypovitaminosis D can cause many diseases in pregnant women such as gestational diabetes mellitus, gestational hypertension, preeclampsia, premature delivery, low birth weight, and impaired neuro development of offspring.^[14-15]

Therefore it is paramount important to ensure healthy pregnancy and skeletal development of fetus and for prevention of pre-eclampsia development, optimum level of Vitamin D should be maintained.^[16] Few studies have examined the role of 25-Hydroxyvitamin D and TSH in association with in pregnancy and conflicting results reported.^[15,17,18]

The aim of this study is to investigate the relationship between 25-Hydroxyvitamin D status and circulating TSH levels in pregnant women.

MATERIALS AND METHODS

A total of 86 subjects were included in this study. They were recruited in Lab medicine department of Pathology, VMCM and Safdarjung

Hospital, during the period from July to August 2020. Written informed consent was taken from all participants.

Exclusion Criteria:

Age <18 years, history of thyroidectomy, radio-Iodine ablation, history of malabsorption disorder, H/o chronic kidney, liver, thyroid disease, on vitamin D and calcium supplementation, H/o diabetes mellitus, dermatological disease, rheumatological disease, alcoholics. Inclusion criteria: Age >18 years pregnant female with no history of thyroid problem, no history of chronic illness.

For measuring 25(OH)D, TSH, T3 and T4:

After aseptic precaution, blood sample was collected by venepuncture at the fasting state, the serum was separated by centrifugation and then stored at -80°C for a week until analysed. Vitamin D status was evaluated by measurement of serum 25(OH)D levels with a chemiluminescent immunoassay method (Seimens Adiva centure CP system). Vitamin D serum level was defined as deficiency, insufficiency and normal for serum level of 25 (OH) D of < 20 ng/ml, between 20 ng/ml and <30 ng/ml and normal >30 ng/ml respectively.^[19]

Statistical Analysis:

Data were statistically analysed by SPSS version-23 for Windows. The mean and the standard deviation (SD) for all the variables were calculated. The differences between mean values for each tested variable have been tested by student's "t" test. The correlations between serum Vit D and TSH were presented by correlation coefficient (r^2). Results considered significant when p value is < 0.05.

RESULTS

In the study a total of 86 pregnant women aged 19-35 years (26.5 years age average) were examined. The mean \pm SD of 25(OH) D was 18.01 ± 4.5 ng/ml (range 8.0 to 31.2). The mean \pm SD levels of serum TSH were 1.69 ± 1.21 mIU/ml.

Number of patients showing vitamin D deficiency, insufficiency and sufficiency were 58 (66.7%), 27(31%) and 2(2.2%) respectively, with mean concentration of 25(OH) D serum of 15.7ng/ml, 23.1 ng/ml and 31.2 ng/ml respectively.(Table-2)

In this study out of 86, 12.8%(11) females were muslim with religious practice of wearing burka.

Table 1: Demographical Characteristics Of Study Group

Variants (n=86)	Mean \pm SD
AGE (years)	26 \pm 3.2
T3 (pg/dl)	1.03 \pm 0.50
T4 (ng/dl)	7.24 \pm 2.66
TSH(mIU/ml)	1.69 \pm 1.3
25(OH) D (ng/ml)	18.1 \pm 4.5

Table 2: Demographical Characteristics Of Patients According To Vitamin D Distribution

25(OH) D	No. and % of patients	Age (Mean \pm SD)Years	Mean \pm SD(vit D)	TSH
<20 ng/ml	58(66.7%)	24 \pm 3.2	15.7 \pm 2.3	1.6 \pm 1.3 (mIU/ml)
20-30 ng/ml	27(31%)	25 \pm 3.1	23.1 \pm 3.1	1.6 \pm 1.3 (mIU/ml)
>30 ng/ml	2(2.2%)	27 \pm 02.1	31.2 \pm 0.3	2.9 \pm 0.6 (mIU/ml)

No significant correlation was found between age, religion, TSH with 25(OH) D levels. (Table-3).

Table 3: Correlation Of 25 (OH) D Levels With Age, Religion And Thyroid Hormone

Variants	Correlation coefficient (r)	p value
Age	-0.015	0.894
Religion	0.021	0.453
T3	0.135	0.111
T4	-0.998	0.046
TSH	0.097	0.376

DISCUSSION

Hypovitaminosis D in pregnancy is a public health problem.^[3] Vitamin 25(OH) D deficiency/ insufficiency in pregnant women ranges from 5%-83.6%.^[14,20] In India 84.3% of urban and 83.6% of rural women had 25(OH)D values below <20ng/ml.^[21] Recent studies have shown that hypovitaminosis D leads to unfavourable outcomes in pregnant females and in their offspring. For this reason they are classified into high-risk group.^[1]

In our study we found 97.7% prevalence of 25 hydroxyvitamin D deficiency/insufficiency in pregnant women. This study is conducted in northern part of India having very good exposure of sunlight during most part of the year. However such high levels of sunshine still not sufficient for vitamin D levels in body. In females many other factors contributes deficiency like duration of exposure to sunlight, clothing habits, use of sunscreen, air pollution vit D status before the pregnancy.^[22]

In recent years evidences are growing that there might be correlation between thyroid hormone and 25 hydroxyvitamin D. Physiologically during pregnancy there is decrease in T4, T3 and TSH levels. In pregnant females thyroid disorder and hypovitaminosis D both can leads to diseases such as gestational diabetes mellitus, gestational hypertension, preeclampsia, premature delivery, low birth weight, and impaired neurodevelopment of offspring.^[14-15] Due to essential role of 25 hydroxyvitamin D in development of fetus, some researchers also recommended supplementation of vitamin D during ante natal period.^[10,23,24] Few studies found there is role of vitamin D on the thyroid gland as they function through similar receptor (VDR).^[2,13,17]

In our study, we found no significant correlation of vitamin D levels with age of women, religion practices and TSH(p>0.05). Also no significant association was found between T4 and vitamin D level, our results are consistent with the with studies by Lavalle G et al, Yamashita H et al and Mackawy AMH et al.^[2,13,17] Moreover we found no correlation between T3 and vitamin D (p>0.05) which is not in concordance with studies Yamashita H et al and Mackawy AMH et al.^[13,17]

This study is cross sectional study, hence causal link cannot be found. In our study we concluded high prevalence of hypovitaminosis D in pregnant women hence public health awareness is needed. We also recommend supplementation of vitamin D before and after pregnancy is essential for both mother and fetus wellbeing.

CONCLUSIONS

We concluded that there is high prevalence of hypovitaminosis D seen in pregnant women. However, we found no correlation between TSH and vitamin D during pregnancy.

Limitations:

The sample size of this study is small and more studies are recommended with greater sample size.

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Nil.

Conflicts Of Interest

There are no conflicts of interest.

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