

ASSESSMENT OF VITAMIN D3 DEFICIENCY AND INSUFFICIENCY IN PREGNANT WOMEN

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ABSTRACT

Objective: To assess the vitamin D3 deficiency and insufficiency in pregnant women.

Subject and Methods: This descriptive cross sectional study was performed at Obstetrics and Gynecology department of Abbasi Shaheed Hospital, Karachi Medical and Dental College, Karachi from January 2021 to December 2022. A total of 114 women reporting to antenatal wards in their third trimester of pregnancy having age

range of 18 to 45years were included. All the information was collected via study proforma

Results: A total of 114 pregnant subjects were studied. Most of the patients were in age range of 21 to 30 years (57.89%). Majority of subjects were either obese (44.73%) or overweight (35.96%). Majority of subjects were having insufficient (43.85%) and deficient (28.94%) levels of vitamin D3.

Conclusion: maternal Vitamin D3 was highly mostly insufficient and deficient in most of the subjects in our part our world

Key Words: *Maternal, Vitamin D3, Deficiency, Insufficiency.*

INTRODUCTION

In addition to being a lipid-soluble vitamin, vitamin D is also a steroid hormone that may be produced internally. It is crucial for maintaining the balance of calcium and phosphorus in the body, and a lack of it may lead to adult-onset osteomalacia and childhood rickets.^{1,2,3}

Sunlight irradiation, food forms, and supplementation are the three primary contributors of vitamin D. In tropical nations, contact to sunshine is the major supply of vitamin D. It is greatly impacted by both climatic and individual variables, including the time of year, geographic location, skin type, amount of accessible body region, and attire.^{4,5}

In many nations across the globe, a lack of vitamin D3 has been highlighted as a concern that affects population healthcare, and women who are pregnant have been recognized as a high-risk category within this population.⁶ Women who are expecting are a unique bunch. Expecting women's metabolic and endocrine processes will alter subtly throughout gestation, and their dietary consumption must take these variations into account as well as their personal demands and those of the developing foetus.⁷

Due to a shortage of vitamin D3 supplemented foods, inadequate calcium consumption, a community with dark complexion, and traditional clothes, vitamin D3 insufficiency is more common in Pakistan (covers hair and neck and usually has a face veil that covers the face).⁸ It is becoming more understood that vitamin D3 deficiency is more common during pregnancy. The likelihood of rickets in babies is increased by vitamin D3 insufficiency during maternity. It may also lead to poor foetal progress and neonatal development.^{9,10} Additionally, a lack of it in expectant women may put them at risk for preeclampsia, gestational diabetes, and primary caesarean delivery.^{11,12}

Fetal intrauterine development constraint and a number of harmful foetal and newborn health effects, such as a greater chance of preterm delivery, abortion, lower birth weight, neonatal hypocalcaemia, and childhood obesity, are all linked to maternal vitamin D insufficiency.^{13,14,15}

Vitamin D concentrations obtained at a single measuring site may not explicitly reflect the vitamin D concentration experienced throughout gestation.¹⁶ The amount of vitamin D in the body may change during the duration of pregnancy. A drop, an elevation, or no alterations in 25(OH)D concentrations were observed by several researchers,

depending on the stage of gestation. Initial vitamin D levels may be identified by assessing vitamin D level in the first trimester.¹⁷

There is an immediate necessity to identify the variables that contribute to vitamin D inadequacy during gestation in attempt to develop efficient preventative measures techniques that could counteract these appalling patterns, given the elevated preponderance of vitamin D deficiency among pregnant women and its unfavourable pregnancy consequences. The purpose of this research is to evaluate pregnant women's vitamin D3 insufficiency and deficiency .

MATERIAL AND METHODS

This descriptive cross sectional study was performed at Obstetrics and Gynecology department of Abbasi Shaheed Hospital, Karachi Medical and Dental College, Karachi from January 2021 to December 2022. A total of 114 women reporting to antenatal wards in their third trimester of pregnancy having age range of 18 to 45 years were included in this research. Women having elective preterm labors, twin pregnancy and those refused to give blood sample were excluded from the study.

Data Collection Procedure

The study was performed after prior permission from hospital's ethical review board. Demographic information of the mothers such as age, gender, BMI, parity, gestational age, socio-economic status, daily sun exposure, daily vitamin D intake, vitamin D dependent diet, history of hijab wearing were recorded.

All of the women who were enrolled had blood specimens drawn during the third trimester of pregnancy and they were submitted right away to the hospital's diagnostics laboratory to check the amount of maternal vitamin D. According to their vitamin D concentrations, the individuals were classified into three groups: deficient (<10), insufficient (10-29), and sufficient/normal (30-100).

Applying SPSS version 21, data analysis was carried out. The qualitative parameters were examined using frequency and percentage. For continuous data, mean and standard deviation were examined.

RESULTS

Table 1 show findings related to demographic variables. According to the results obtained, most of the patients were in age range of 21 to 30 years (57.89%). Majority of subjects were either obese (44.73%) or overweight (35.96%) as per their BMI. According to parity, majority subjects were in between 1-2 (55.26%). Around 77.19% subjects were more than 36 weeks as per their gestational age. About 55.26% said they are not exposed to regular sunlight, while 44.26% had habit of regular sun exposure. In terms of hijab wearing, 39.47% reported that they have history of regular hijab wearing. Around 51.75% were taking vitamin D dependent supplements.

As per results, majority of subjects were having insufficient and deficient levels of vitamin D3, as shown in figure 1.

In assessing the Mean and SD of Maternal Vitamin D Level, normal/sufficient level was 48.14 ± 14.72 , deficient was 8.23 ± 1.69 and insufficient level reported was 16.249 ± 5.45 . all these details are mentioned in table 2.

Table 1: Demographic Characters of Pregnant Women

VARIABLE	N=114	%
Age of Patient		
< 20 Years	09	7.89%
21-30 Years	66	57.89%
31- 45 Years	39	34.21%
BMI		
Underweight	05	4.38%
Normal	17	16.66%
Overweight	41	35.96%
Obese	51	44.73%
PARITY		
1-2	63	55.26%
3-4	37	32.45%
≤ 5	14	12.28%
GESTATIONAL AGE		
≤ 36	26	22.80%
>36	88	77.19%
SUN EXPOSURE		
Yes	51	44.7%
No	63	55.26%
HISTORY OF HIJAB WEARING		
Yes	45	39.47%
No	69	60.52%
INTAKE OF VITAMIN D DIET		
Yes	59	51.75%
No	55	48.24%

Figure 1: VITAMIN D STATUS IN PREGNANT WOMEN

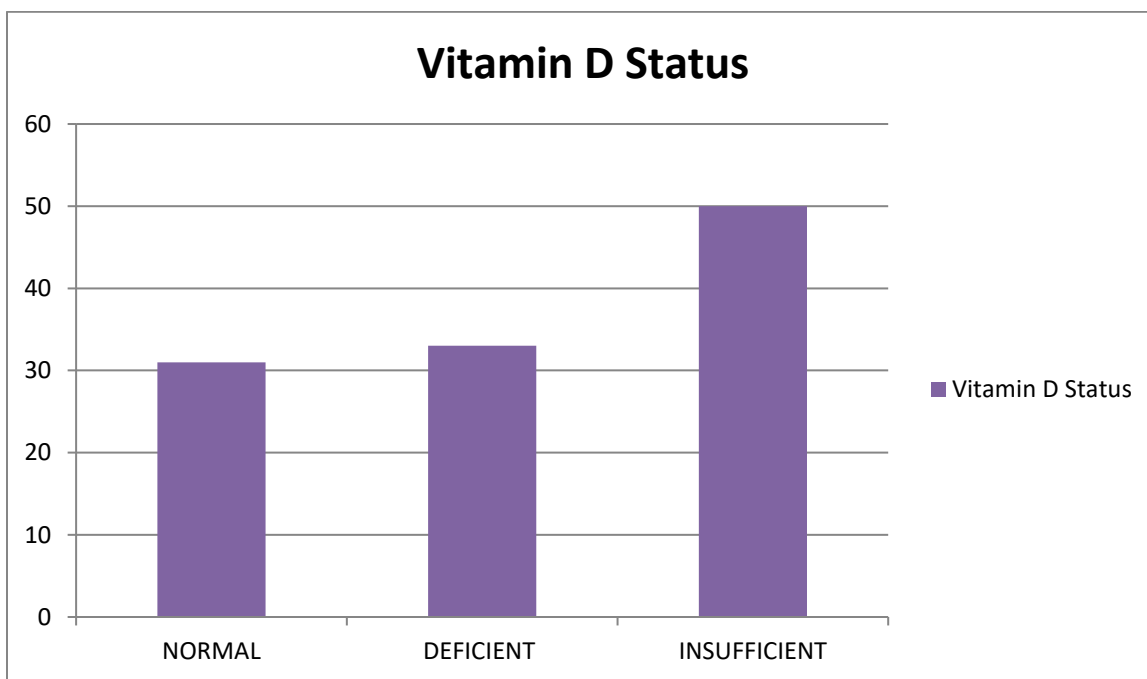


Table 2: Assessment of Mean and SD of Maternal Vitamin D Level

VITAMIN D LEVEL	MEAN & SD
Normal/Sufficient	48.14±14.72
Deficient	8.23±1.69
Insufficient	16.249±5.45

DISCUSSION

In tropical nations, contact to sunlight is the major provider of vitamin D. It is greatly impacted by both climatic and individual variables, including the time of year, geographical longitude, skin type, amount of accessible body region, and garments. In poor nations, vitamin D3 insufficiency in pregnant women and their newborn children continues to be a major health concern.⁶

This current study has demonstrated 33 patients (28.94%) having deficient level of vitamin D and 50 subjects (43.85%) were having insufficient level. According to investigations from various nations, vitamin D insufficiency affects pregnant women and

newborns at rates of 4% to 60% and 3% to 86%, correspondingly.^{18,19} About 35.8% of expectant women had blood concentrations exceeding 20 ng/mL, according to a study by El Koumi et al in Egypt.²⁰ In Hefei, Anhui Province, from 2015 to 2017, expecting women's vitamin D insufficiency exhibited an increased tendency year by year, reaching a peak of 81.4% in 2017. This is reported by Yin Wanjun et al.²¹ In a comparable line, a research that was conducted out by Woon FC⁴ indicated that 42.6% of the pregnant women were lacking in vitamin D, and nearly half of them (49.3%) were inadequate in vitamin D levels. The findings from our research were consistent with those of numerous other investigations that have already been cited.

According to the findings of a research that was carried out in West Sumatra, Indonesia, the incidence of vitamin D deficiency and insufficiency among expectant women in their third trimester was found to be 61.3%.²² This finding was also in similarity to our data as our study also comprises patients in their third trimester of pregnancy.

There are various papers published that evaluated a number of variables related to maternal vitamin D3 insufficiency. Mothers were shown to have substantial hazards for reduced vitamin D3 levels, including dressing up for religious and cultural reasons (reducing exposure), rarely outdoor exercise, inadequate consumption of vitamin D3-rich food sources, and being overweight prior to maternity. The abovementioned elements are reliable indicators of vitamin D3 insufficiency, according to other datasets.²³

Winter, poor socioeconomic position, low educational attainment, and covered dress pattern have all been linked to vitamin D insufficiency in mothers in prior research.^{24,25}

However, Pehlivan et al²⁶ found no significant difference related to factors other than covered clothing.

Additionally, it is highly probable that an integration of vitamin D3 supplements, foods that have been fortified with vitamin D3, and alterations in way of living (such as increasing the amount of time spent in the sun in a safe manner) will prove to be the most effective method for ensuring that pregnant women have adequate levels of vitamin D3. In further research, we will need a bigger sample size in order to provide a more accurate depiction of the vitamin D status of pregnant women in Pakistan.

CONCLUSION

It was concluded that, maternal Vitamin D3 was highly mostly insufficient and deficient in most of the subjects in our part our world. The findings of our research underline the critical need of giving vitamin D3 deficiency in pregnant women more attention from the public health community. As a result, the appropriate actions must to be taken in order to enhance the vitamin D status of pregnant women.

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