

VITAMIN D DEFICIENCY; PREVALENCE IN PREGNANT WOMEN

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DR. MUHAMMAD ASLAM

Associate Prof of Forensic Medicine
University Medical and Dental College
Faisalabad

DR. ABDUL SATTAR

Department of Community Medicine
Independent Medical College
Faisalabad.

DR. ZAHID MASOOD

Associate Prof of Community Medicine
University Medical and Dental College
Faisalabad

Miss. Maria Qudsia

4th Year MBBS Student
University Medical and Dental College
Faisalabad

ABSTRACT... Objective: To study the Prevalence of Vitamin D deficiency in pregnant women. **Study Design:** A Cross-sectional analytical study through convenient sampling technique. **Setting and duration:** At a private Clinic located at East Canal Road Faisalabad, from March 2011 to June 2011. **Material and method:** The study included consecutive 61 pregnant women of reproductive age and non-pregnant women were excluded. Blood samples were taken in morning i.e. overnight fasting samples, by venepuncture by disposable syringes sample were taken and samples were stored at -20 degree centigrade till they were analyzed. Our interest was in age and serum Vitamin D 3 levels. **Results:** Out of 61 pregnant women results showed that 87.0% pregnant women were having Vitamin D deficiency, 10.0% were having Vitamin D insufficiency, 3.0% had Vitamin D sufficiency and none shows Vitamin D intoxication. Vitamin D deficiency was more prevalent in pregnant women of younger age group. Furthermore prevalence was higher among the pregnant mothers with high parity. Moreover, 65% women were not exposed to sunlight properly, 60% women had muscle cramps and bony aches. 90% women never were tested for tested Vitamin D levels before. **Conclusions:** Prevalence of Vitamin D deficiency is significant in pregnant women. It is also important for its effects on various organs and systems of body as well as on pregnancy and neonate. The different aspects of study led to conclusion to emphasize that Health education be imparted to pregnant women and their families in terms of diet, proper sunlight exposure and taking Vitamin D supplements in pregnancy. It is thus recommended to perform Vitamin D levels in every pregnant woman.

Key words: Vitamin D deficiency, Prevalence, Pregnant women, Rickets, Osteomalacia

INTRODUCTION

Vitamin D is recognized as the sunshine vitamin for good reason. During exposure to sunlight, the ultraviolet B portion of the solar spectrum, with energies between 290 to 315 nm, penetrates into the epidermis. This ultraviolet radiation is absorbed by 7-dehydrocholesterol in the skin¹. Ultraviolet light is the major source (80%) of vitamin D and its dietary sources are egg yolk, oily fish, butter, milk. There are a few research publications available to prove that vitamin D deficiency is not uncommon in Pakistan. Faisalabad is located at 31 N latitude and 73 E longitude with abundant sunshine throughout the year² correctly applied sunscreen reduces our ability to absorb vitamin D by more than 90%. The ultraviolet B (UVB) rays from sun—known as “tanning” rays and the rays that trigger the skin to produce vitamin D—are stronger near the equator and weaker at higher latitudes³. Vitamin D levels and its association with vitamin D deficiency was according to following reference values⁴.

REFERENCE RANGES

Vitamin D deficiency	<20 ng/ml
Vitamin D insufficiency	21-29 ng/ml
Vitamin D sufficiency	> 30 ng/ml
Vitamin D intoxication	> 150 ng/ml

Maternal or early life vitamin D deficiency has been linked to an increased risk of several disorders, including neonatal craniotabes, prematurity, type 1 diabetes mellitus, schizophrenia, and childhood respiratory infections and wheeze^{5,6}. Further, the seasonal timing of pregnancy appears to pose an increased future risk for multiple sclerosis in the developing fetus. As the biologically active vitamin D is generated in the skin during exposure to ultraviolet light, the increased risk of multiple sclerosis may be related to seasonal vitamin D deficiency⁷. A correlation has been found between obesity and vitamin D levels. A two fold increase in the odds of a mid-pregnancy vitamin D deficiency has been

documented among women with body mass indices between 22 and 34⁸.

Vitamin D deficiency is unexpected in a tropical country such as India. Nevertheless, hypovitaminosis D, resulting in severe osteomalacia, has been observed in India⁹. This paradox may be partly explained by the many prevalent social and cultural practices in India that preclude adequate exposure of adolescent girls and young women to sunshine. Revealing clothing is frowned on in traditional Indian households, both rural and urban. Newly married females are expected to cover themselves even more and are discouraged from outdoor activity. Increasing urbanization that results in poor outdoor activity and greater pollution, coupled with skin pigment, may further compound this problem¹⁰. The scenario is similar in Pakistan as well².

One of the consequences of vitamin D deficiency, documented by researchers at the University of Pittsburgh, is an increased risk for preeclampsia. This risk was especially prevalent among African-American women than white women¹¹. There is evidence that vitamin D plays a role in controlling blood pressure and preventing artery damage¹². In Australia, there has been a resurgence of rickets — partly owing to an increased refugee population comprising dark-skinned and veiled women with vitamin D deficiency, and also because of decreased exposure of babies to sunlight, lack of supplementation of infant feeds with vitamin D and weaning of infants onto non-milk liquids¹³.

Although rare, severe maternal vitamin D deficiency can lead to rickets in the developing fetus. Evidence is accumulating that even less severe vitamin D deficiencies in utero may affect immune function and bone development from birth through adulthood^{14,15}. In a recent study by researchers at McGill University and the University of Montreal, vitamin D has been found to have a direct effect on two genes that have been associated with Crohn's disease, beta-defensin and NOD2¹⁶. Other effects on neonates are increased risk of bronchial asthma, diabetes related autoimmunity, decreased length at birth¹⁷ and low birth weight¹⁸. There is especially strong evidence for a relationship between vitamin D

deficiency and cavities. Cavities are associated with poor dental health^{19,22}. Due to wide spread implications of Vitamin D deficiency on human body especially in pregnancy this study was initiated.

MATERIAL & METHODS

The study included consecutive 61 pregnant women in 1st, 2nd and 3rd trimester in age group ranging from 18 to 50 years. It was conducted at a private Clinic located at East Canal Road Faisalabad, from March 2011 to June 2011. Blood samples were taken in morning with overnight fasting samples; by venepuncture. Samples were stored at -20 degree centigrade till they were analyzed. Maternal serum was taken as a sample and sent to a Standard Laboratory of the country for Vitamin D -3 estimation.

Our interest was in age and serum Vitamin D levels. The qualitative analysis was done. Pregnant women in upper middle and upper socioeconomic status were included. To establish socioeconomic status (SES), socioeconomic index was prepared.

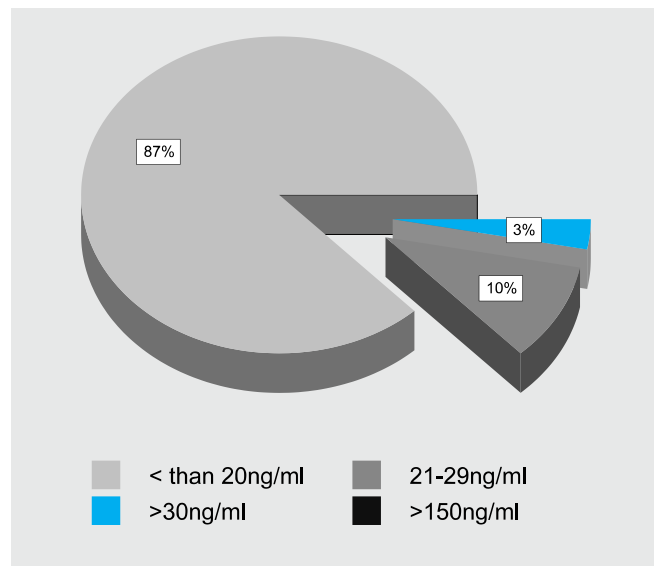
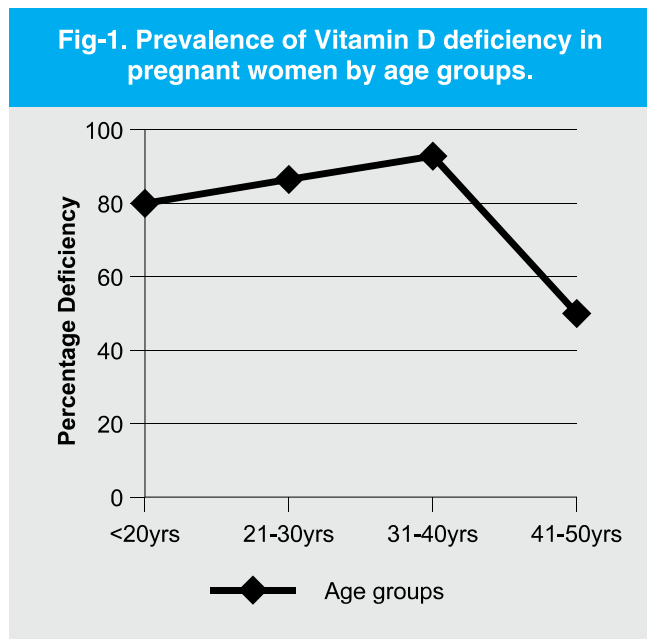
RESULTS

The results of study were alarming and are appended below. The peak prevalence of vitamin D deficiency was observed in pregnant women of age group 31-40 years (92.85%) and least in age group 41-50 years (50%). Maximum Vitamin D insufficiency was in women of age less than 20 years (20%). It was observed that Maximum Vitamin D sufficiency was in women of age between 41-50 years (50%). Intoxication level of vitamin D was not found in any single pregnant woman.

DISCUSSION

Vitamin D is also called the sunshine vitamin because the major source (80%) of vitamin D is Ultraviolet light. Pakistan is rich in abundant sunshine throughout the year². However, Vitamin D deficiency is common in Pakistan. This paradox may partly be explained by the many prevalent social and cultural practices in Pakistan that preclude adequate exposure of adolescent girls, young and pregnant women to sunshine. Increasing urbanization is also one of the reasons that results in poor outdoor activity. Any reductions in sun exposure attributable to the limited mobility during later stages of

Table-I. Prevalence of Vitamin D Level in different Age Groups (n=61)				
Age group	Vitamin D deficiency (%) <20 ng/ml	Vitamin D insufficiency (%) 21-29 ng/ml	Vitamin D sufficiency (%) > 30 ng/ml	Vitamin D intoxication (%) > 150 ng/ml
18-20 years	80	20	-	-
21-30 years	86.50	10.80	2.70	-
31-40 years	92.85	7.15	-	-
41-50 years	50	-	50	-
Overall	87.03	100	3.0	-



pregnancy can also cause vitamin D deficiency. So the following reasons increase the importance of dietary sources of vitamin D like milk, butter, egg yolk and oily fish. 87%, 10%, 3%, <than 20ng/ml, 21-29ng/ml, >30ng/ml, >150ng/ml.

This study is comparable with various studies of India that is also a tropical country with abundant sunshine and with widely reported vitamin D deficiency due to the problems similar in Pakistan².

The National Institutes of Health considers 2000 IU to be the daily tolerable upper limit of vitamin D intake in pregnant women, but scientists wanted to know whether higher doses would be safe for pregnant women, and

more importantly, whether using higher doses to attain sufficient blood levels of vitamin D would reduce the risk of pregnancy complications. According to a research, vitamin D supplementation of up to 4000 IU is safe for pregnant women and also reduces the vitamin D affected pregnancy complications such as pre-term labor, pre-term birth, and infection²³.

Given recent discoveries that link vitamin D with the innate immune system²⁴, it is not unreasonable to predict that deficiencies during fetal development could have lasting sequelae on the child, not only in terms of bone mineralization, but also in terms of immune development that becomes the basis for later derangements seen with long-latency diseases such as multiple sclerosis, rheumatoid arthritis, diabetes, and certain cancers²⁵. Studies to examine the benefit of higher doses of vitamin

D during pregnancy suggest that the dose of vitamin D found in most prenatal vitamins—400 IU—is inadequate to meet the needs of the pregnant woman and her growing fetus^{26,27,28-30}. It appears that the results are comparable with studies done elsewhere especially in subcontinent of Indo Pak.

CONCLUSIONS

Prevalence of Vitamin D deficiency is significant in pregnant women. Taking into account the emerging role of vitamin D in immune maintenance throughout the body and the mounting evidence to support the importance of vitamin D in maintaining good health, at the very least, women who are deficient in vitamin D should be counseled regarding the risks of vitamin D deficiency for themselves and their offspring and recommended a therapy to ensure vitamin D adequacy.

It is also important for its effects on various organs and systems of body as well as on pregnancy and neonate. The different aspects of study further led to conclusion to emphasize on point that Health education be imparted to pregnant women and their families in terms of diet, proper sunlight exposure and taking Vitamin D supplements in pregnancy. It is thus recommended to perform Vitamin D levels in every pregnant woman like screening of Hepatitis B and C is done.

LIMITATIONS OF THE STUDY

Equal number of women from different age groups was not included in study. We did not consider diet of women. The study was conducted on Muslim women. Serum PTH, Alkaline Phosphatase levels were not done due to high cost.

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Correspondence Address:

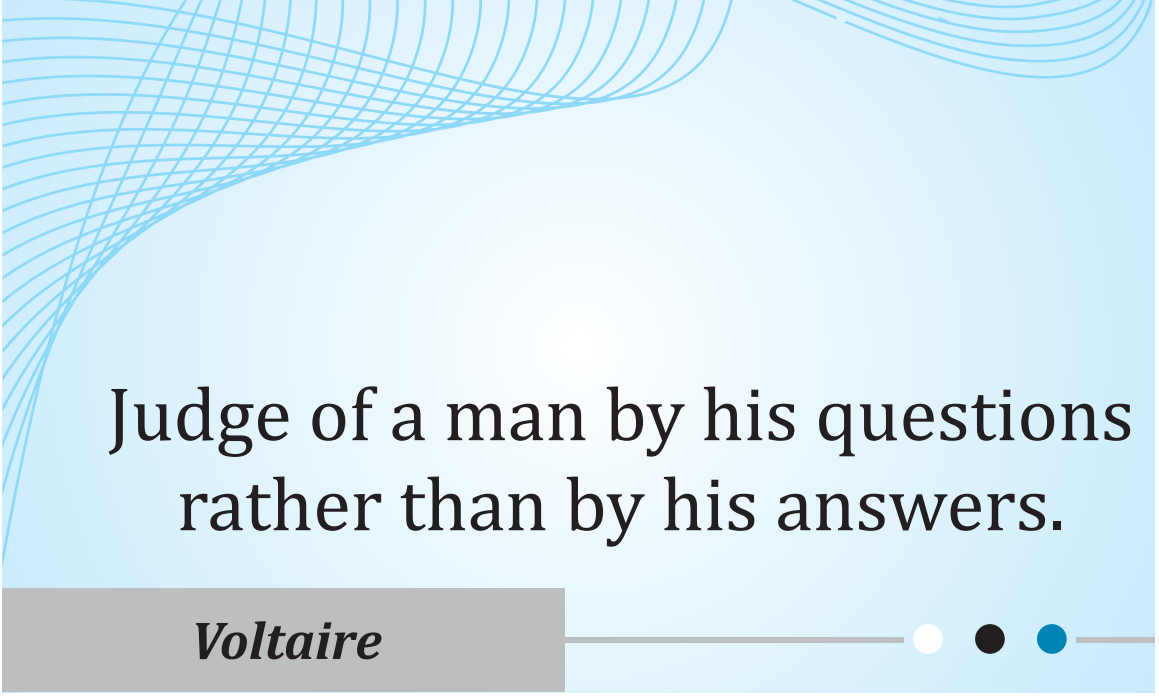
Dr Zahid Masood
 Department of Community Medicine
 University Medical and Dental College
 Faisalabad
 zahidmd27@gmail.com

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Judge of a man by his questions
rather than by his answers.

Voltaire