



Frequency of vitamin D inadequacy in asymptomatic population.

1. MBBS, FCPS
Assistant Professor Obstetrics & Gynaecology
Gambat Institute of Medical Sciences (GIMS),
Khairpur Mirs, Safeer Autos, Agra Road, Gambat, Sindh.
2. MBBS, FCPS
Assistant Professor Obstetrics & Gynecology
Lady Willingdon Hospital, Khairpur Medical College, Khairpur Mirs.
3. MBBS, FCPS
Senior Registrar Gynae Unit 2
DMC, CHK.
4. MBBS, FCPS
Assistant Professor
Bahria University Medical & Dental College.
5. MBBS, FCPS
Gynaecologist
Taluka Hospital. Mehar Dadu.
6. MBBS, FCPS
Assistant Professor Community Medicine
GMC Gambat District Khairpur Mirs.

Correspondence Address:

Dr. Asifa Abdul Jabbar
Obstetrics & Gynaecology
Gambat Institute of Medical Sciences (GIMS),
Khairpur Mirs, Safeer Autos, Agra Road, Gambat, Sindh.
asifaabduljabbarhkp@gmail.com

Article received on:

18/07/2020

Accepted for publication:

02/09/2020

INTRODUCTION

Vitamin D (sunlight Vitamin) is a fat soluble vitamins it is produced in the skin as there action to the sun exposure. Vitamin D contains many key functions in the body, plays a vital role in regulating calcium and phosphorous, and facilitates the normal immune system. An adequate quantity of Vitamin D is required to improve the bones and teeth, also to improve the resistance of certain diseases.¹ It has been now established that Vitamin D serves as an active hormone acting as a transcription factor that regulates the function of more than 200 genes.^{2,3}

Vitamin D deficiency leads to many chronic including autoimmune disorders, obesity, Type-2 diabetes, cardiovascular events, various types of cancers, adverse pregnancy outcomes, metabolic syndrome, and increases the risk of

Asifa Abdul Jabbar¹, Fozia Unar², Fiza Ali Khan³, Shahida Karamat⁴, Naeem Akhter Khokhar⁵, Asghar Memon⁶

ABSTRACT... Objectives: The aim of study was to determine vitamin d deficiency in age and sex groups associated with different regions. . **Study Design:** Cross-sectional study. **Setting:** Department of Obstetrics and Gynaecology, Gambat Institute of Medical Sciences Gambat, Khairpur Sindh. **Period:** 14 August 2016 to 24 February 2018. **Material & Methods:** Total 1924 participants were screened and included in the study by fulfilling the inclusion criteria. All participants who met the inclusion and exclusion criteria were interviewed after taking informed consent. Questionnaires for the study were prepared and distributed to the selected population. According to the questionnaire and interviews by the researchers, details of lifestyles, social status, and monthly income were reported. Moreover, marital status, milk in take, and sun exposure hours were also asked. Blood sample of each participant was taken after taking written informed consent form. A total 1924 people screened for Vitamin D levels with help of direct chemiluminescence using ADVIA Centaur assay. **Results:** 1924 people from five different regions of Gambat. A total of 1153 (59.9%) people with vitamin D deficiency were found, while 724 showed normal rates and 47 found to be larger than normal. Females are more deficient for vitamin D (35.7%) than males (24.4%). **Conclusion:** The high population without symptoms with low levels Vitamin D is an alarming sign of deteriorating health, while multiple risk factors appear.

Key words: Asymptomatic, Deteriorating Health, 25-hydroxycholecalciferol, Sunlight, Vitamin Deficiency.

Article Citation: Jabbar AA, Unar F, Khan FA, Karamat S, Khokhar NA, Memon A. Frequency of vitamin D inadequacy in asymptomatic population. Professional Med J 2020; 27(12):2569-2573. <https://doi.org/10.29309/TPMJ/2020.27.12.5700>

mortality due to associated complications.⁴

Vitamin D deficiency worldwide is a public health problem at present, as it becoming increasing common due to sedentary lifestyle, limited exposure to the sunlight and aging. Obesity linked to Vitamin D deficiency as increased BMI leads to low levels of Vitamin D levels, but there is no evidence that Vitamin D deficiency causes obesity.⁵ People with high BMI need frequent doses of Vitamin which are actually stored in adipose tissue. Patients with Type-1 and Type-2 diabetics have a high proportion of Vitamin D deficiency associated with insulin secretion, glucose intolerance, inflammation and adverse lipid profile.⁶

Thus, Vitamin D may increase secretion and sensitivity, improving B-cell role and declining

inflammatory cytokines and insulin resistance. Vitamin deficiency lead to the development of osteoporosis and osteoporotic fractures, which are secondary to hyperparathyroidism and can cause rickets and osteomalacia.^{7,8}

Vitamin D inhibits rheumatoid arthritis, diabetes mellitus, coronary heart disease, respiratory diseases, metabolic syndrome, multiple sclerosis, and impaired cognition. In addition, Vitamin D deficiency appears to be linked with an increased risk of obesity, and Vitamin D supplemented can help improve clinical symptoms of patients with atopic dermatitis. If there is insufficient exposure to sunlight, Holicks recommends 800-1000 IU/d in both children and adults.^{9,10}

There is an urgent requirement for the clinical management of this common disorder. In this study, clinically healthy individuals were assessed using an advanced technique to detect deficiency of Vitamin D. Based on this study, correlation was developed such as patient's age, and sex associated serum measurement etc. The study was conducted in Gambat, a rural area of Province Sindh, Pakistan to illustrate the lack of Vitamin D, a major risk factor commonly associated with various diseases, while most people do not realize it. One of the distinguishing features of this study is an advance technique using the ADVIA Centaur Assay which provides an accurate level of Vitamin D.

MATERIAL & METHODS

A prevalence study was conducted at the Gambat Institute of Medical Sciences from August 14, 2016 to February 26, 2018. Total 1924 participants were screened and included in the study by fulfilling the inclusion criteria. In this study healthy adult age ≥ 15 years of age who came as attendants to their hospitalized patients were included. Exclusion criteria were signs and symptoms of any chronic disease, active injury, abnormal liver function or any chronic kidney and pregnancy problem. All participants who met the inclusion and exclusion criteria were interviewed after taking informed consent.

Questionnaires for the study were prepared and distributed to the selected population. According to the questionnaire and interviews by the researchers, questionnaire was administered to determine the age, sex, occupation, details of duration of exposure to sun light in previous month, area of skin exposed, type of residence used to live, clothing and dietary habits. Various studies have been reported about the potential role of vitamin D in preventing or treating obesity. Obesity is a medical condition in which excess body fat has accumulated to the extent that it may have a negative effect on health. Diagnosis is BMI >30 kg/m². In Pakistan quarter of the population was overweight or obese as Asian-specific BMI cut off of 23 kg/m².¹¹

In this study, blood sample of each participant was taken after taking written informed consent form. Blood was collected 3-5mls from each study subject in a gel tube to analyze Vitamin D level. The serum was prepared by centrifugation at 3,000 rpm for 5 minutes. A total 1924 people screened for Vitamin D levels with help of direct chemiluminescence using ADVIA Centaur assay.¹²

Data were entered and analyzed in SPSS version 21, through filled Questionnaires and were analyzed statistically for mean, frequency and percentage were calculated for all quantitative variable. Mean+SD were calculated for age. Frequency & percentages were calculated for vitamin D deficiency. Post stratification chi-square test were applied <0.05 were taken as significant.

RESULTS

A total of 1924 people were screened for vitamin D in this study and out of these, 1153 were found vitamin D deficiency in different areas interior Sindh, Pakistan (Figure-1). Area 1 participants are 600 out of which 241 normal, 348 deficient and 11 found greater. Area 2 participants are 454 out of which 140 normal, 305 deficient and 9 found greater. Area 3 total participants are 380 out of which 150 normal, 220 deficient and 10 found greater. Area 4 total participants are 270 out of which 120 normal, 142 deficient and 8 found greater. Similarly, Area 5 total participants are 220 out of which 73 normal, 138 deficient and

9 found greater.

Out of total 1924 subjects, 1153 subjects proved as Vitamin D deficiency, whereas, 724 proved as normal range and 47 proved greater than normal ranges (Figure-2). Out of which 724 (37.6%) are normal with 20-100 ng/ml, 1153 (60%) are deficient having deficiency = <20 ng/ml and 47 (2.4%) are greater => 100 ng/ml in Vitamin D.

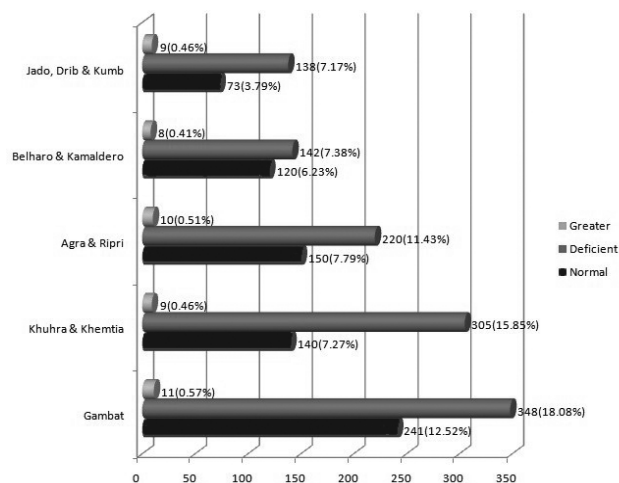


Figure-1. Vitamin D have been conducted in five different rural areas of Gambat (N=1924)

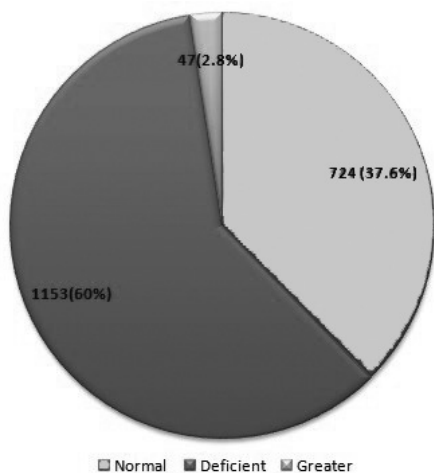


Figure-2. Status of Vitamin D (N=1924)

In this study, a total of 1154 females were found as 687 (35.70%) Vitamin D <20 ng /mL and 439 (22.81%) were 20-100 ng/m with only 28 (1.5%) females were >100 ng/ml. In comparison of total 770 males in which males were found as 466 (24.22%) were Vitamin D <20 ng/ml and 258

(14.81%) 20-100 ng/ml with only 19 (1.0%) were > 100 ng / ml (Figure-3).

The results indicate that females are more at risk of getting Vitamin D deficiency at age that is 31 to 40 years resulting 14.60%. Males develop more Vitamin D deficiency in their ages from 41 to 50 years resulting 8.67% (P Value: 0.03) (Figure-4).

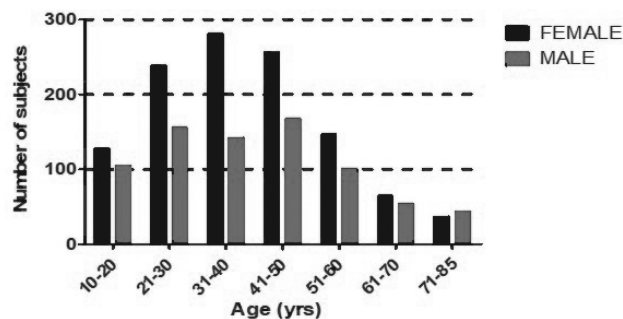


Figure-3. Shows that age distribution, 4th and 5th decade of females are more deficient than males (N=1924)

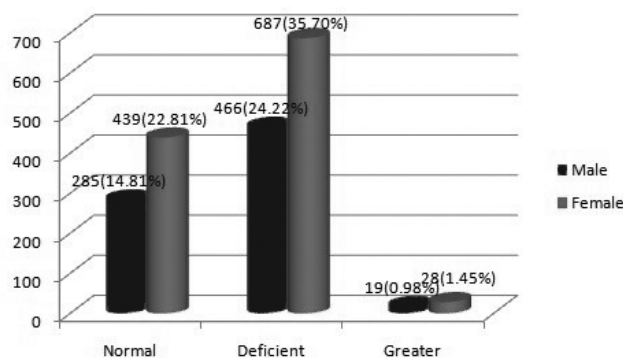


Figure-4. Figure shows that females are at higher risk in deficient of Vitamin D than males (N=1924)

DISCUSSION

This study indicates females are more deficient in comparison of males. Females are usually more obese as compared to males. In some studies, the association between obesity and Vitamin D deficiency was found that Vimalleswaran and his colleagues^{4,13} observed that a high BMI leads to decreased Vitamin D status. In this study most females were obese and more deficient in vitamin D levels.

Expectedly, this is one of the largest studies conducted in interior Sindh province of Pakistan to assess 25-hydroxy Vitamin D levels in

asymptomatic population. This complements the studies of, Sheikh and colleagues, Iqbal and colleagues as well as Pakistan's Nutritional Survey in 2011.^{14,15} Best Vitamin D levels are only appear in people showing to severe sunlight on their exposed skin, resulting in a 25-hydroxyVitamin D serum level of 50-70 ng/mL.

Although, Pakistan is among the world's richest in the sun exposure with Vitamin D production throughout the year due to its latitude and altitude. It is proposed that about 5 - 30 minutes of sun exposure during day time, usually between 10 AM to 3 PM for twice a week without sunscreen can help the vitamin D for synthesis in the body.^{16,13} But still a high rate of Vitamin D deficiency has been observed in this study. Similarly, results showing the deficiency of Vitamin D have also been seen in previous studies conducted in Pakistan and its neighboring countries, as well as studies of Pakistani women in other countries.^{13,17}

Furthermore, other authors have also shown the higher rate of deficiency of Vitamin D in postmenopausal women and higher prevalence in lower income groups.¹⁸ Previous studies have shown high rate of Vitamin D deficiency in Pakistan, but none have evaluated Vitamin D deficiency in all age groups, incomes and gender to guide future strategies.¹⁹

In this study prevalence of low level of Vitamin D more in females compared to males explained on both cases found that obesity may reduce the level of Vitamin D. The dilution of Vitamin D intake, which is cutaneously synthesized in large adipose tissues for obese patients, is explained by their usual Vitamin D status.^{20,21} Therefore, patients with a BMI greater than 25 may need higher or repeated doses of Vitamin D. It has been well recognized that obesity is related with Vitamin D insufficiency.²² This observation raises the question of whether the cause due to obesity or obesity is the result of low levels of Vitamin D. It has been reported that low skin Vitamin D synthesis was observed with aging and even exposure similar to solar radiation in elderly patients produces up to 75% less Vitamin D compared to young people.²³

We had several limitations. The research was done over a period of time. We were unable to calculate the daily intake of vitamin D in the diet for a number of reasons. Duration of sun exposure was based on recall rather than actual. We also ignored cloudy and rainy days during the study.

CONCLUSION

Vitamin D deficiency is frequent common in females in local healthy population of Gambat City, Sindh province of Pakistan. The study on deficiency of vitamin D in health population could be beneficial for the awareness and prevention from risk factors that cause various major diseases.


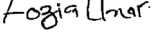

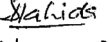
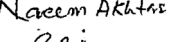
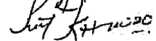
Copyright© 02 Sep, 2020.

REFERENCES

1. Iqbal K, Islam N, Mehboobali N, Asghar A, Iqbal SP, Iqbal MP. **Relationship of sociodemographic factors with serum levels of vitamin D in a healthy population of Pakistan.** Pak J Pharma Scie. 2019; 32(1):29-34.
2. Khan AH, Jafri L, Siddiqui A, Naureen G, Morris H, Moatter T. **Polymorphisms in the GC gene for vitamin D binding protein and their association with vitamin D and bone mass in young adults.** J Metabolism. 2019; 29(8):715-9.
3. Mubashir M, Anwar S, Tareen AK, Mehboobali N, Iqbal K, Iqbal MP. **Association of vitamin D deficiency and VDBP gene polymorphism with the risk of AMI in a Pakistani population.** Pak J Med Sci 2017 33:1349-54.
4. Pilz S, Verheyen N, Grübler MR, Tomaschitz A, März W. **Vitamin D and cardiovascular disease prevention.** Nature Reviews Cardiology. 2016 Jul; 13(7):404-9.
5. Vimalleswaran KS, Berry DJ, Lu C. **Causal relationship between obesity and vitamin D status: bi-directional Mendelian randomization analysis of multiple cohorts.** PLoS Med. 2013; 10(2):e1001383.
6. Rosen CJ. **Clinical practice. Vitamin D insufficiency.** N Engl J Med. Jan 20 2011; 364(3):248-254.
7. Christakos S, Dhawan P, Verstuyf A, Verlinden L, Carmeliet G. **Vitamin D: Metabolism, molecular mechanism of action, and pleiotropic effects.** Physiological reviews. 2016 Jan; 96(1):365-408.
8. Adams JS, Hewison M. **Update in vitamin D.** J Clin Endocrinol Metab. 2010; 95(2):471-8.

9. Hassan-Smith ZK, Hewison M, Gittoes NJ. **Effect of vitamin D deficiency in developed countries.** British Med Bulletin. 2017; 122(1):79-89.
10. Holick MF. **High prevalence of vitamin D inadequacy and implications for health.** Mayo Clin Proc. Mar 2006; 81(3):353-373.
11. Pathak K, Soares MJ, Calton EK, Zhao Y, Hallett J. **Vitamin D supplementation and body weight status: A systematic review and meta-analysis of randomized controlled trials.** Obes Rev. Jun 2014; 15(6):528-537.
12. Musetti V, Masotti S, Prontera C. **Evaluation of the analytical performance of a new ADVIA immunoassay using the Centaur XPT platform system for the measurement of cardiac troponin I.** Clin Chem Lab Med. 2018; 56(9):229-31.
13. Bener A, Al-Hamaq AO, Saleh NM. **Association between vitamin D insufficiency and adverse pregnancy outcome: global comparisons.** Int J Womens Health. 2013; 5:523-531.
14. Khan AH, Iqbal R, Naureen G, Dar FJ, Ahmed FN. **Prevalence of vitamin D deficiency and its correlates: Results of a community-based study conducted in Karachi, Pakistan.** Arch Osteoporos. 2012; 7:275-282.
15. Iqbal R, Jafri L, Haroon A, Habib Khan A. **Illuminating the dark side--vitamin D status in different localities of Karachi.** J Coll Physicians Surg Pak. Aug 2013; 23(8):604-606.
16. Rizwan M. **Defeat the 'D' deficiency--be sun smart.** Journal of Pakistan Association of Dermatology. 2016; 23(4):357-359.
17. Mansoor S, Habib A, Ghani F, et al. **Prevalence and significance of vitamin D deficiency and insufficiency among apparently healthy adults.** Clin Biochem. Dec 2010; 43(18):1431-1435.
18. Reyes-Garcia R, Garcia-Martin A, Palacios S, Salas N, Mendoza N, Quesada-Charneco M, Fonolla J, Lara-Villoslada F, Muñoz-Torres M. **Factors Predicting the Response to a Vitamin D-Fortified Milk in Healthy Postmenopausal Women.** Nutrients. 2019 Nov; 11(11):2641.
19. Grant WB, Al Anouti F, Moukayed M. **Targeted 25-hydroxyvitamin D concentration measurements and vitamin D3 supplementation can have important patient and public health benefits.** Eur. J. Clin. Nutr. 2020 Jan 29; 74:366-76.
20. Gupta A. **Vitamin D deficiency in India: Prevalence, causalities and interventions.** Nutrients. Feb 21 2014; 6(2):729-775.
21. Drincic AT, Armas LA, Van Diest EE, Heaney RP. **Volumetric dilution, rather than sequestration best explains the low vitamin D status of obesity.** Obesity (Silver Spring). Jul 2012; 20(7):1444-1448.
22. Matyjaszek-Matuszek B, Lenart-Lipinska M, Wozniakowska E. **Clinical implications of vitamin D deficiency.** Prz Menopauzalny. Jun 2015; 14(2):75-81.
23. Pourshahidi LK. **Vitamin D and obesity: Current perspectives and future directions.** Proc Nutr Soc. May 2015; 74(2):115-124.

AUTHORSHIP AND CONTRIBUTION DECLARATION

| Sr. # | Author(s) Full Name | Contribution to the paper | Author(s) Signature |
|-------|----------------------|----------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 1 | Asifa Abdul Jabbar | Conception and design, Statistical expertise. |  |
| 2 | Fozia Unar | Critical revision of the article for important intellectual content. |  |
| 3 | Fiza Ali Khan | Data collection, Critical revision, Drafting of the article. |  |
| 4 | Shahida Karamat | Data collection. |  |
| 5 | Naeem Akhter Khokhar | Data collection. |  |
| 6 | Asghar Memon | Drafting. |  |