RESEARCH ARTICLE

Vitamin D Status and Correlation among Iraqi Adult Patients Attending Teaching Hospital in Babylon Governorate, Iraq

Amasee F. Jabbar[1], Hasan A. Baiee[2]*, Fadhil K. Jassim[3]

[1]*Department of Family Medicine, College of Medicine, University of Babylon, Hillah, Iraq*
[2]*Department of Nursing, Hilla University College, Hillah, Iraq*
[3]*Merjan Medical City, Babylon Health Directorate Corresponding, Iraq*

Received: 17th December, 2021; Revised: 13th February, 2022; Accepted: 26th February, 2022; Available Online: 25th March, 2022

ABSTRACT

Background: Globally vitamin D deficiency affected about one billion individuals. Vitamin D deficiency contributed to many health problems included serious chronic diseases. Previous studies had shown high rates of vitamin D deficiency in Iraq despite appreciable levels of sunshine. However, none have studied the features of vitamin D status among hospital patients with chronic diseases in Babylon province.

Objectives: To identify the prevalence of Vitamin D inadequacy and its correlation among patients attending Merjan Teaching Hospital.

Methodology: A cross sectional hospital-based study conducted using a pretested Questionnaire and blood sampling technique to measure Vitamin D serum levels among 240 conveniently selected patients in Merjan Teaching Hospital, Babylon governorate, Iraq, during the period from 1 February through June 2021.

Results: High levels of deficiency among patients admitted to Merjan Teaching Hospital regardless the age, gender, income levels, and education and type of diseases. Amongst the studied patients, only (15.3%) of the participants had normal vitamin D serum level while more than half of them (53.5%) with vitamin D deficiency and (31.2%) insufficient Vitamin D. a significant and inverse associations were identified between inadequacy of vitamin D and diabetes or hypertension.

Conclusions: High rates of vitamin D deficiency among Iraqi patients despite high levels of sunshine, inadequacy was significantly with aging, being female and having diabetes or hypertension. Public health strategies needed to address this high deficiency rates, including screening for VD inadequacy, food fortification with VD, health education campaigns for increasing exposure to sunlight all strongly needed requested.

Keywords: Babylon, Diabetes, Hypertension, Iraq, Patients, Vitamin D status.

International Journal of Drug Delivery Technology (2022); DOI: 10.25258/ijddt.12.1.56

How to cite this article: Jabbar AF, Baiee HA, Jassim FK. Vitamin D Status and Correlation among Iraqi Adult Patients Attending Teaching Hospital in Babylon Governorate, Iraq. International Journal of Drug Delivery Technology. 2022;12(1):306-309.

Source of support: Nil.

Conflict of interest: None

INTRODUCTION

Vitamin D deficiency VDD (< 20 ng/mL) is becoming increasingly common in majority of population worldwide.[1] Vitamin D (VD) deficiency is highly prevalent worldwide.[2] About 50% of population in developing countries lack VD.[3] Many factors increase the deficiency of VD including less sunlight exposure, darkness skin, elderly, and use of clothes covering most of the body, female gender, and obesity.[4] Vitamin D in adequacy considered as an important cause of many chronic diseases in men and women.[5] VD inadequacy is associated with many infectious diseases (bacterial, viral and fungal). A case control study, conducted in Iran reported that, the mean serum vitamin D level was 19.91 ng/mL in human brucellosis case group and 22.87 ng/mL in the control group.[6] In a study conducted at Ayub Teaching Hospital in Pakistan, high VDD was reported among 202 patients with complaints of generalized body aches.[7] VDD and VD insufficiency combined are an important public health problem in Iraq and associated with many chronic diseases.[8,9] Therefore, the objectives of the study are to assess the frequency of VD inadequacy among patients attended Merjan teaching hospital, Babylon, Iraq and to investigate its associated factors.

METHOD

This was a cross-sectional study conducted on convenient sample (240 adult patients) who attended or admitted to Merjan Teaching Hospital in Babylon Governorate Iraq. A purposive non-probability sample (convenient sample) which

Author for Correspondence: hassanbaey@yahoo.com

was consisted of 240 adults from both genders were selected from the above-mentioned settings to conduct the study. The requested number was selected in convenient way.

The period of the study started from 1 February to June 2021. A pretested semi-structured questionnaire was used to collect the data requested through interviewing the participants after obtaining their verbal consents, questionnaire incudes demographic data tobacco smoking habits, exposure to sun light more than 30 minutes per day and his/her knowledge about the importance of VD to the health. The sample includes all adult patients of both genders who accepted to participate in this study. This study was conducted in accordance with the ethical principles. It was conducted with patients' verbal and analytical approval before the sample was taken. The study protocol and the subject information and consent form were reviewed and approved by a local ethics committee (Hilla University College). Serum level of Vitamin D was assessed using chemoimmunoassay method. The weight was measured in kilogram, height was measured (in centimeters). The BMI was calculated according to weight in kg/height in m2, then classified according to the World Health Organization (WHO) categories. Statistical analysis Data analysis was using the Statistical Package for the Social Sciences version 22. Qualitative data were described using the number and percent. Quantitative data were presented as mean and standard deviation. Chi-square test was applied for comparison of categories; Independent t test was applied to compare means of the study variables. $p < 0.05$ was adopted as the level of statistical significance.

Table 1: Demographic and socio-economic features of participants (N=240)

Demographic and socio- economic variables		*No. (%)*
Age groups (Years)	20–29	39 (16)
	30–39	41 (17)
	40–49	56 (23)
	50–59	49 (20)
	60–69	29 (12)
	70–79	21 (9)
	80–89	5 (2)
Gender	Males	108 (45)
	Females	132 (55)
Educational level	Illiterate	44 (18)
	Primary	74 (31)
	Secondary	62 (26)
	University	60 (25)
Income	not enough	96 (40)
	Enough	137 (57)
	more than enough	7 (3)

Table 2: Means and standard deviations of baseline characteristics of the study group

Variable	*Mean (± SD)*
Age (years)	46.89 (15.395)
BMI	31.3 (6.42)
Vitamin D levels (ng/mL)	20.52 (10.92)
Cigarettes smoked per day (smokers)	26.84 (10.2)

RESULTS

Table 1 reveals that the most common age groups of participants are 40–49 years and 50–60 years respectively. About half of them have low educational level (primary school level and below =49%), 57% of participants mention that they have enough monthly income while 40% considered poor (with not enough monthly income). Table 2 shows the Means and standard deviations of baseline characteristics of the study group (age mean 46.9 ± 15.4 years), while the mean of serum VD for the total sample was 20.52 ± 10.92 ng/mL.

Figure 1 shows the prevalence of VD inadequacy among all participants (VD deficiency 58%, insufficiency 23% and normal level 19%).

RESULTS

Table 3 depicts the Vitamin D level differences between females and males, females have significantly and statistically lower serum VD level than males; t student test value = 4.26, df = 238, $p < 0.01$.

Table 4 shows the distribution of BMI according to vitamin D serum levels, although obese patients have high rate of VDD, but this difference does not reach a statistically significant level p-value =0.76.

Table 5 shows the serum VD levels and comorbidities (Diabetes mellitus and hypertension), there are strong statistically significant inverse relationship between the prevalence of the two diseases and serum VD level $p < 0.05$. Tobacco smokers have higher serum VD level.

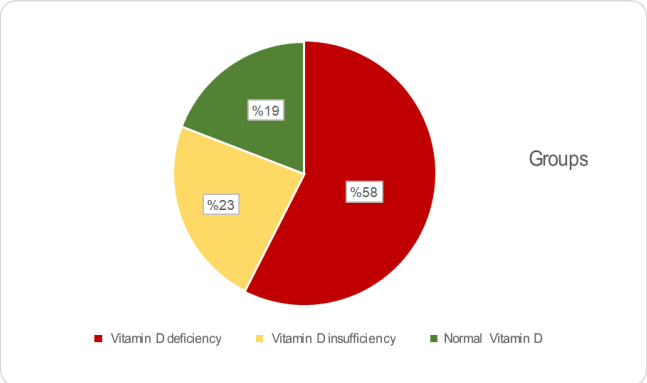

Figure 1: Prevalence of vitamin D serum levels among the study group

Table 3: Vitamin D level differences between men and women

Gender	*Number*	*Mean of vitamin D levels (ng/mL)*	*± SD*	*t*	*Df*	*p-value*
Male	108 (45%)	23.74	9.3	4.26	238	*p <0.01* [a]
Female	132 (55%)	17.9	11.47			

DISCUSSION

The low level of serum VD detected in this study is higher than what was reported by other studies,[10] this result goes in line with findings of other local researchers who estimated the prevalence of VD inadequacy among elderly, diabetics, hypertensive and obese people in Iraq (Figure 2).[9,11] But the result of this study is lower than what was reported by Hantoosh HA *et al* (2019) who found very high rate of VD in adequacy among Iraqi female patients; they found that only 7% of the studied women in Babylon governorate had sufficient vitamin D Serum level,[12] other study in Kerbela governorate showed that 87% of female patients had VD inadequacy.[13] Regarding age and its relation to VDD, the current study, the results of this study show a significant relationship between progressing in age and vitamin D inadequacy, this result agrees with the finding of Mendes J. *et al*.[14] Although less than half of participants have poor awareness about the importance of VD adequate level to our health, a positive association is identified in this study between low educational level and VDD, this result is supported by the findings of Santos A, *et al*., 2017.[15] This may be because high educational level gives the persons information about the benefits of vitamin D and encourage them to get more knowledge to use the natural source of this essential vitamin. Among finding in this study is the positive and significant association between low serum VD levels among females, this finding is similar to the finding reported by others.[16]

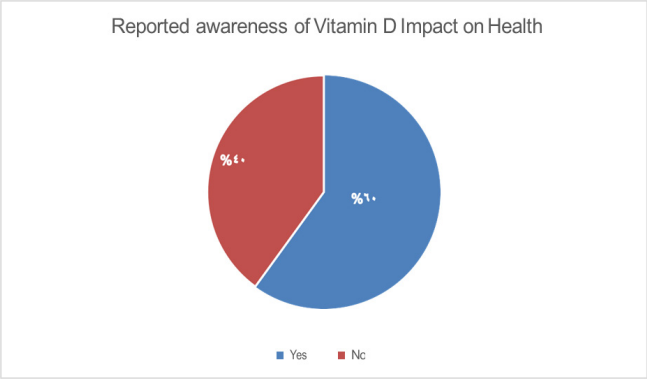

Figure 2: Level of awareness about the importance of VD adequate level on health

Table 4: Distribution of BMI according to vitamin D serum levels

	Overall	*Vitamin D inadequacy*	*Normal vitamin D*
Group	*N (%)*	*N (%)*	*N (%)*
Normal BMI	47	37 (78.7)	10 (21.3)
Overweight	46	36 (78.3)	10 (21.7)
Obese	147	121 (82.3)	26 (17.7)
Total	240	194 (81)	46 (19)
p = 0.76			

This finding disagrees with finding reported by a study conducted by (El sammak, *et al*., 2011)[17] who found no significant difference VD serum level between males and females, in our society we can explain this low-level VD among women due to cultural and religious factors social habits and the effects of multiple pregnancy. The current study identifies that VD level is not significantly correlated with BMI. The mean BMI of patients is 31.3 that indicates that obesity is a common health problem in our local society.

In this study, no significant relationship between current tobacco smoking and vitamin D inadequacy was detected, this result disagrees with the finding of other researchers[18] who found that a significant relationship between smoking and vitamin D low serum level. An association between smoking and low VD being found in other studies showing current smoking is associated with lower VD serum concentrations which contradict our finding[19] (Moon JH. *et al*., 2018).

In the current study, diabetes mellitus, and hypertension are the most common reported chronic non-communicable diseases that correlated significantly with VD inadequacy. There is evidence that VDD causes multiple diseases including hypertension and its complications.[20,21] Various mechanisms supposed to play role in the effect of vitamin D on blood pressure, one of which is the renin-angiotensin system that is the important contributor to systolic blood pressure.[22]

A study has reported contradictory result regarding the association between vitamin D level and hypertension in men and women.[23] A study recommends that vitamin D can be used as an adjuvant drug to control the blood pressure on hypertensive patients with vitamin D deficiency.[24]

Vitamin D levels having been found by other investigators to be inversely related to glycosylated hemoglobin levels in diabetes mellitus. Our result goes in line with the findings of other investigators.[25-27]

Table 5: Distribution of comorbidities and smoking habit according to vitamin D level status (n=240)

Overall (N = 240)			*Vitamin D deficiency*	*Vitamin D insufficiency*	*Normal vitamin D levels*	*p-value*
Smoking						
	Non-smoker	166	103 (62)	34 (20.5)	29 (17.5)	0.004
	Smoker	74	35 (47.3)	22 (29.7)	17 (23)	
Comorbidities						
	Hypertensive	97	67 (69.1)	23 (23.7)	7 (7.2)	<0.001
	Non-hypertensive	143	71 (49.7)	33 (23)	39 (27.3)	
	Diabetic (mellitus)	50	39 (78)	8 (16)	3 (6)	0.003
	Non-diabetic	190	99 (52.1)	48 (25.3)	43 (22.6)	

CONCLUSION

High rates of vitamin D deficiency among Iraqi patients despite high levels of sunshine, inadequacy was significantly with aging, being female and having diabetes or hypertension. Public health strategies needed to address this high deficiency rates, including screening for VD inadequacy, food fortification with VD, health education campaigns for increasing exposure to sunlight all strongly needed requested.

REFERENCES

1. Mendes J, Santos A, Borges N, Afonso C, Moreira P, Padrão P, Negrão R, Amaral TF. Vitamin D status and functional parameters: A cross-sectional study in an older population. PLoS One. 2018 Aug 21;13(8):e0201840.
2. Alcubierre N, Valls J, Rubinat E, Cao G, Esquerda A, Traveset A, *et al*. Vitamin D deficiency is associated with the presence and severity of diabetic retinopathy in type 2 diabetes mellitus. J Diabetes Res. 2015;2015:374178
3. Liefaard MC, Ligthart S, Vitezova A, Hofman A, Uitterlinden AG, Kiefte- de Jong JC, *et al*. Vitamin D and C-reactive protein: A mendelian randomization study. PLoS One. 2015;10:e0131740.
4. Mandarino NR, Júnior FD, Salgado JV, Lages JS, Filho NS. Is Vitamin D deficiency a new risk factor for cardiovascular disease? Open Cardiovasc Med J. 2015;9:40–9.
5. Hoseinzadeh E, Taha P, Wei C, Godini H, Ashraf GM, Taghavi M, Miri M. The impact of air pollutants, UV exposure and geographic location on vitamin D deficiency. Food Chem Toxicol. 2018 Mar;113:241-254.
6. Behzad M,Amjad A,Anvar MohammadiB, Ebrahim G, Shahla A, Samaneh A,Katayoon H. Relationship between vitamin D levels and brucellosis: a case-control study from Sanandaj, Iran. Iranian Journal of Microbiology. Apr2021;13 (2):248-251.
7. Jadoon SA, Ahmed A, Alam MA. Vitamin D deficiency in Pakistan: tip of Iceberg. J Ayub Med Coll Abbottabad. 2018;30(1):78–80.
8. Riaz H, Finlayson AE, Bashir S, Hussain S, Mahmood S, Malik F, Godman B. Prevalence of Vitamin D deficiency in Pakistan and implications for the future. Expert Rev Clin Pharmacol. 2016;9(2):329-38. doi: 10.1586/17512433.2016.1122519. Epub 2016 Jan 13. PMID: 26582317.
9. Jawad, I. H. & Baiee, H. A. Prevalence of vitamin D deficiency and its correlate with overweight and obesity in community-dwelling old adults. Medical Journal of Babylon. 2020;17: 36–40.
10. Al-Sharifi ZAR, Al-Ammar HAJ, Mahmood HG, Turki K M,Al-Karkhi I I. Lack of Vitamin D in Iraqi Children With Asthma. Biomed Pharmacol J 2017;10(1).
11. Jawad IH, Baiee HA.Vitamin D Level Status and Hypertension among Old Adult Iraqi People in Al Hillah City. Indian Journal of Forensic Medicine & Toxicology, July-September 2020, 14 (3): 1670-1675
12. Hantoosh HA, Mahdi MH, Imran BW, Yahya AA. Prevalence of vitamin D deficiency in Iraqi female at reproductive age. Med J Babylon 2019;16:119-22
13. Al Janaby S, Al Timimy G, Al yassery R. Prevalence of Vitamin D Deficiency of Females in Karbala, Iraq, 2017. Karbala Journal of Medicine 2020; 13 (1):2319-2325
14. Mendes J, Santos A, Borges N, Afonso C, Moreira P, Padrão P, *et al*. (2018) Vitamin D status and functional parameters: A cross-sectional study in an older population. PLoS ONE 13(8): e0201840.
15. Santos A, Amaral TF, Guerra RS, *et al* Vitamin D status and associated factors among Portuguese older adults: results from the Nutrition UP 65 cross-sectional study.BMJ Open. 2017;7:e016123.
16. DasP,SamadN, AhinkorahBO,HaganJE, PeprahP,MohammedA, Seidu AA. Effect of Vitamin D Deficiency on COVID-19 Status: A Systematic Review. COVID 2021, 1, 97–104.
17. El sammakMY, Al Wossaibi AA, Al Howeish A,Al saeed J. High prevalence of vitamin D deficiency in the sunny Eastern region of Saudi Arabia: a hospital-based study. *EMHJ - Eastern Mediterranean Health Journal, 2011;17(4),317-322,*
18. Al-Dabhani K, Tsilidis K, Murphy N. *et al*. Prevalence of vitamin D deficiency and association with metabolic syndrome in a Qatari population. Nutr & Diabetes. 2017; 7 (e263).
19. Moon JH, Kong MH, Kim HJ. Effect of Secondhand Smoking, Determined by Urinary Cotinine Level on Bone Health. International journal of preventive medicine. 2018; 9 (1)|: 14.
20. Fouda MA, Turkistani IZ, Angkaya-Bagayawa FF, *et al*,. Vitamin D deficiency in young women of childbearing age the elephant in the room. Int Journal Clin Exp Med. 2016; 9: 4615-9.
21. Singh S, Shankar R, Singh GP. Prevalence and Associated Risk Factors of Hypertension: A Cross-Sectional Study in Urban Varanasi. Int Journal Hypertens. 2017;2017:5491838.
22. Cabrera-Sole RM, Rivera LU, Lucas CT, Salazar DC, Saldaña MA. Isolate systolic hypertension and central pressures in elderly patients. Differencesbetweenmenandwomenwithsimilarperipheral pressures. Journal Am Soc Hypertens 2016;10:e2-3
23. Snijder, M.B., Lips, P.T.A.M., Seidell, J.C., Visser, M., Deeg, D.J.H., Dekker, J.M. and Van Dam, R.M.,. Vitamin D status and parathyroid hormone levels in relation to blood pressure: a population-based study in older men and women. *Journal of internal medicine*, 2007; *261*(6):.558-565
24. He S, Hao X. The effect of vitamin D3 on blood pressure in people with vitamin D deficiency: A system review and meta-analysis. Medicine (Baltimore).2019;98(19):e15284.
25. Sehgal G, Singh J, Kumar S. Evaluation of serum 25-hydroxy vitamin D levels in type 2 diabetes mellitus patients. Int Journal Health Sci Res 2017; 7:137–140.
26. Swamy MK, Akhtar MS, Sinniah UR. Antimicrobial Properties of Plant Essential Oils against Human Pathogens and Their Mode of Action: An Updated Review. Evid Based Complement Alternat Med. 2016; Volume 2016 |Article ID 3012462.
27. SadiyaA,AhmedSM,SkariaS,AbusnanaS. VitaminDstatusandits relationship with metabolic markers in persons with obesity and type 2 diabetes in the UAE: a cross-sectional study. Journal Diabetes Res. 2014;2014:869307.