

## Vitamin D3 concentration in serum of Diabetic Menopausal Women

Enas Jabbar Hasan

Science Department, basic education College,

University of Al-Mustansiriya, Iraq

[enasjabbar.edu@uomustansiriyah.edu.iq](mailto:enasjabbar.edu@uomustansiriyah.edu.iq)

### Abstract

Vitamin D is a fat soluble very important for regulation Calcium, Zinc and iron, menopausal women have deficiency estrogen level and that lead to increasing risk factor of reducing the density of bone, diabetes. **Aim:** To elevated the vitamin D<sub>3</sub> concentration in diabetic menopausal women and compared with control group, and determine some clinical parameter. **Method:** this study consist of 70 women divided into two group (35 diabetic menopausal women and the other 35 was control group without diabetes mellitus), their age range 45-55 years old, collected from National Diabetic Center, Al-Mustansiriya University, Baghdad. **Result:** there was no significant appear in BMI and age of menopausal females with diabetic and control group, higher level of HbA1c and FBS in diabetic menopausal women with control group, while LH, FSH, and estrogen levels was significantly lower in diabetic menopausal women with control group. Vitamin D<sub>3</sub> concentration appeared significantly lower in diabetic menopausal women with control group. **Conclusion:** In diabetic menopausal women, vitamin D<sub>3</sub> level was significant lower than control group.

**Key word:** vitamin D<sub>3</sub>, menopausal, diabetic mellitus, estrogen.

### Introduction

Diabetic mellitus is a metabolism and lifestyle disorder caused by either resistance or deficiency of insulin. DM is distinguished by compromised glucose tolerance, changed the secretion of insulin and chronic hyperglycemia<sup>(1)</sup>. Vitamin D often know as sunshine vitamin<sup>(2)</sup>, vitamin D is fat soluble includes vitamin D<sub>2</sub> and D<sub>3</sub>, vitamin (D<sub>3</sub>) is synthesized in body skin from 7- dehydrocholesterol by sun light and by the liver action, kidney and mitochondrial hydroxylases is converted to the 1,25(OH)<sub>2</sub>D<sub>3</sub> biologically active form<sup>(3)</sup>. Vitamin D is very important for regulating phosphorus, calcium, zinc and iron intestinal absorption and bone metabolism<sup>(4)</sup>. The essential role of vitamin D is regulated the immune function, growth of the cell, and reduced damage tissue<sup>(5)</sup>. Vitamin (D) deficiency results from many factors like inadequate sun exposure, poor intake vitamin D in nutrition, and medication such as anticonvulsants<sup>(6)</sup>. Vitamin (D) deficiency can cause

several diseases: rickets in children and caused abnormalities of skeletal, osteomalacia, osteopenia, osteoporosis and incidence of fractures in adults <sup>(7)</sup>. Menopause is a natural aging process for women occurred when their menstruation and fertility was stopped <sup>(8)</sup>, it diagnosis after 12 months of missed their menses; the age range of menopause women is 45-55 years <sup>(9)</sup>. In menopausal age, estrogen levels was decrease and will changed the components of women body like fat mass increasing and leads to increasing the risk of vitamin D deficiency <sup>(10)</sup>. The decreasing amounts of produced estrogen by the ovaries associated many diseases such as cardiovascular, cancer, osteoporosis and diabetes <sup>(11)</sup>. The present study was evaluates the level of vitamin D<sub>3</sub> of diabetic menopausal women and compared with healthy as control.

### Material and method

the study included 70 women divided into two group (35 diabetic menopausal women and the other 35 was control group ( menopausal without diabetes mellitus), their age range 45-55 years old, All measurements were done in National Diabetic Center, Al-Mustansiriya University, Baghdad from the first August 2024 to January 2025. Age and BMI (kg/m<sup>2</sup>) were measurements for patients and control groups. Also measured the levels of estrogen, FSH (follicle stimulation hormone), Luteinizing hormone (LH), FBS (fasting blood sugar), Hb1Ac (glycated hemoglobin) by minividas (Biomerieux). To measured vitamin D<sub>3</sub> level using an enzymelinked immunosorbent assay (ELLIZA) kit.

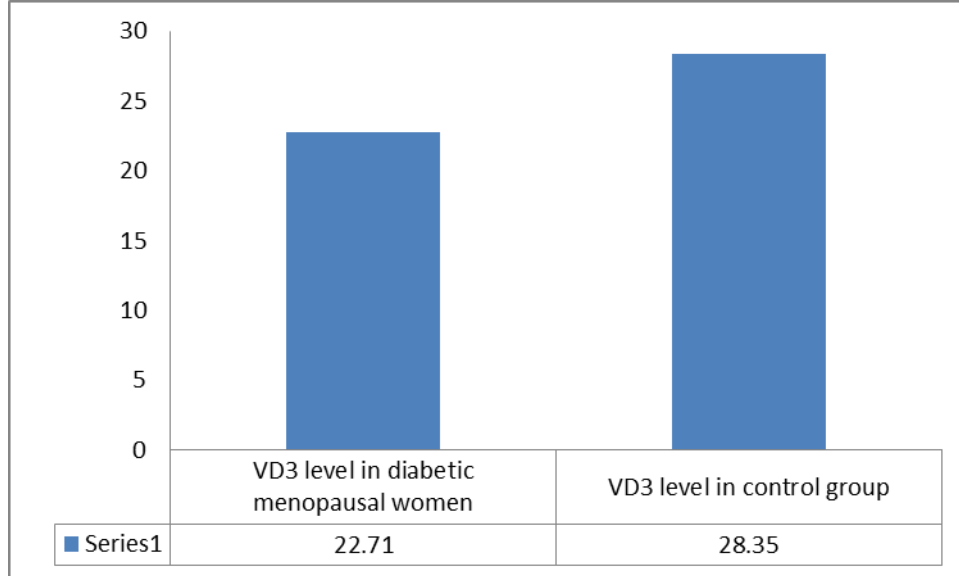
### Data analysis:

Students t-tested was applied to comparison statistical mean difference between the two groups at  $P \leq 0.05$  was considered statistically significant.

### Results and discussion

**Table1:** serum biochemical variables in diabetic menopausal females and control group.

biochemical variables	diabetic menopausal females mean±SD	control group mean±SD	P value
age (years)	47.52±4.98	47.41±5.9	> 0.05
BMI( kg/m <sup>2</sup> )	35.22±3.92	36.68±3.81	>0.05
FBS(mg/dL)	182±73.4	97.72±8.63	<0.001
HbA1c %	8.52±3.29	4.53±1.47	<0.01
FSH	60.41±4.43	55.37±8.32	<0.01
LH	27.74±3.22	30.52±2.32	<0.01
Estrogen	24.61±11.7	41.9±6.23	<0.001
vitamin D <sub>3</sub>	22.71±7.5	28.35±11.82	<0.01



**Figure (1):** vitamin D<sub>3</sub> concentration of diabetic menopausal women and control group.

Table1 displayed some biochemical variable in patients (diabetic menopausal females) and control group, no significant differences appeared in BMI and age between menopausal women with diabetic and control group also data showed a higher level of HbA1c and FBS diabetic menopausal women ( $8.52 \pm 3.29$ ) ( $182 \pm 73.4$ ) respectively than control group ( $4.53 \pm 1.47$ ) ( $97.72 \pm 8.63$ ) respectively this result agreement with the result obtained by Kanchana R<sup>(2)</sup> and Doddamni<sup>(12)</sup>. FSH serum level was significantly higher menopausal women with diabetic ( $60.41 \pm 4.43$ ) than control group ( $55.37 \pm 8.32$ ), in the menopausal, the production of (FSH) in the pituitary increases to recompense the estradiol depression levels due to a decrease the function of ovarian<sup>(13)</sup>, while LH, prolactin and estrogen levels showed a significantly lower in diabetic menopausal women ( $27.74 \pm 3.22$ ) ( $20.28 \pm 3.88$ ) ( $24.61 \pm 11.7$ ) respectively than control group ( $30.52 \pm 2.32$ ) ( $24.32 \pm 4.92$ ) ( $41.9 \pm 6.23$ ) respectively. Estrogen in females has a conservative effect on the developing diabetes<sup>(14)</sup>, and it make cell of the body more sensitive to insulin<sup>(15)</sup>. In menopausal women deficiency of estrogen level are associated with deficiency of vitamin D<sup>(16)</sup>.table (1) and figure (1) show a significant decrease in vitamin D<sub>3</sub> serum level in diabetic menopausal women ( $22.71 \pm 7.5$ ) compared with control group ( $28.35 \pm 11.82$ ) this result was agreement with Pannu et.al<sup>(17)</sup>, Tandon et.al<sup>(18)</sup>, and Anita Kumari<sup>(19)</sup>. Vitamin D is a steroid hormone its main function is to preserved homeostasis

of calcium, bone health and beneficent the immune function <sup>(19)</sup>. Vitamin D deficiency in menopausal women may occur due to lack of exposure to sun light or poor diet <sup>(20)</sup>. The current study was conducted in a Muslim country, which means that women cover most of their bodies, which prevents the skin from being exposed to sun light; this is one of the reasons for vitamin D<sub>3</sub> deficiency <sup>(21)</sup>. Vitamin D improves production of insulin from  $\beta$ -cell in the pancreas <sup>(22)</sup>, so low level of vitamin D<sub>3</sub> associated with insulin resistance <sup>(23)</sup>, and decreased insulin production <sup>(23, 24)</sup>.

### Conclusion

The level of vitamin D<sub>3</sub> in diabetic menopausal women was lower than control group. Vitamin D<sub>3</sub> deficiency associated with diabetic, obesity, poor diet and low exposure to sun light.

### References

- 1- Shivwani D. K., Anjali N. B., Sabita Y., Suresh K. (2020)" Evaluation of vitamin-D status in premenopausal and postmenopausal type-2 diabetic women and its relation to glycemic control" Int J Res Med Sci.;8(4):1292-1298.
- 2- Kanchana R., Pushpa K. (2024)" Vitamin D levels in postmenopausal women and their relationship with diabetes mellitus" National Journal of Physiology, Pharmacy and Pharmacology; 14 (08):1528-1532.
- 3- Andrea G., Roger B., Bess D., Peter R. E., Marise L., Paul L., Claudio M., John P. B.(2023)" Vitamin D in the older population: a consensus statement" Endocrine ;79:31-44.
- 4- Nithya P J., Bharathi R., Nikil S. (2017)" Study of Vitamin D Status among Postmenopausal Women" J South Asian Feder Menopause Soc.;5(1):28-34.
- 5- Matta R. A., Iqbal M., Chopra H., Urmi S., Junapudi S., Bibi S., et al. (2022)" Pivotal role of vitamin D in mitochondrial health, cardiac function, and humanreproduction" Excli J. 21: 967-990.
- 6- Anita K., Vinita K. (2018)" The Study of Vitamin D deficiency in Peri and Postmenopausal Women of Jamshedpur, Jharkhand" International Journal of Contemporary Medical Research; 5(12):4-6.
- 7- Nahid R.J., Mohammad H.R., Shokouh O., Leila A. (2016)" The association between Vitamin D and health outcomes in women: A review on the related evidence" J Res Med Sci; 21:76.
- 8- Mridu S, Goe J. K., Shanti S., Akanshamani (2019)" Prevalence of vitamin D deficiency in postmenopausal women and its association with fasting blood sugar" Int J Reprod Contracept Obstet Gynecol.;8(7):2617-2621.

- 9- Linda A.F., Samuel A.S., William K. B. A. O. , Edwin F. L., Eddie-W.O., Ebenezer K.A., Richard K. D. E. , and Osei S. K. (2018) "Evaluating Vitamin D Status in Pre- and Postmenopausal Type 2 Diabetics and Its Association with Glucose Homeostasis" *BioMed Research International* ;2 <https://doi.org/10.1155/2018/9369282>.
- 10- Atikha A. H., M Fidel G.S., M. S., Henry S. S., Sarma N. L., Mohd. R. Z. T. (2022) "Correlation of Vitamin D3 Levels and Lipid Profiles in Menopausal Patients" *JETIR*; 9(12): e442-e450.
- 11- Srimani S., Saha I., Chaudhury D. (2017) "Prevalence and association of metabolic syndrome and vitamin D deficiency among postmenopausal women in a rural block of West Bengal, India" *PLoS One*; 12(11):e0188331.
- 12- Doddamani G.B., Kora S., Chickmath R. (2013) "Serum Vitamin D levels in newly detected type 2 diabetes mellitus" *Scholars J Appl Med Sci* ;1:786-8.
- 13- akako K., Toshiyuki Y., Kanako Y., Sumika M. and Takeshi I. (2023) "Associations of LH and FSH with reproductive hormones depending on each stage of the menopausal transition" *BMC Women's Health*; 23:286 <https://doi.org/10.1186/s12905-023-02438-5>
- 14- Zhaojun M., Hong H., Y. and Dandan L. (2023) "The role of vitamin D in menopausal women's health" *Frontiers in Physiology*; 14:1211896 doi: 10.3389/fphys.2023.1211896.
- 15- Mayumi O., Seiji N., Yoko I.E. et al.(2003) "Effect of post-menopausal hormone replacement therapy on HbA1c levels" *Diabetes care*, 26:1088-1092.
- 16- Kanwar S.N., Shekhawat M., Sharma P., Hada R.(2015) "Comparison of vitamin D levels in pre and post menopausal type 2 diabetic females". *IOSR J Dental Med Sci*.; 14 (8):70-73.
- 17- Pannu P.K., Zhao Y., Soares M.J., Piers L.S., Ansari Z.(2017) "The associations of Vitamin D status and dietary calcium with the metabolic syndrome: An analysis of the victorian health monitor survey". *Public Health Nutr*; 20:1785-1796.
- 18- Tandon V.R., Sharma S., Mahajan S.(2014) "Prevalence of vitamin D deficiency among Indian menopausal women and its correlation with diabetes: A first Indian cross-sectional data". *J Midlife Health*. ; 5(3):121-125.
- 19- Anita K., Vinita K. (2018) "The study of Vitamin D deficiency in Peri and Postmenopausal Women of Jamshedpur, Jharkhand" *International Journal of Contemporary Medical Research*; 12(5):14-16.



## وقائع المؤتمر العلمي لكلية التربية الأساسية في مجال العلوم المصرفية

وتحت شعار

(العلوم المصرفية والتطبيقية بوابة لخدمة المجتمع)

يومي الاربعاء و الخميس 28\_29/5/2025

- 
- 20- Holick M.F., Chen T.C. (2008) "Vitamin D deficiency: a worldwide problem with health consequences". Am J Clin Nutri. 2008 Apr 1; 87(4):1080S-1086S.
- 21- Weaam F. A. (2024) "Study of vitamin D deficiency among menopausal women in Basrah city" Iraqi National Journal of Medicine; 6( 1):26-31.
- 22- Khol G.L., Chee W.S., Shariff Z.M., Pouth M., et al.(2011) "High prevalence of vitamin D insufficiency and its association with BMI for age among primary school children in Kuala Lumpur, Malaysia" BMC Public Health; 11:95.
- 23- Elmer P. S. K. G., Bubblu T., and Amarabalan R., (2011) "Rajendran Amarabalan: Role of Vitamin D in Diabetes" Journal of Endocrinology and Metabolism; 1(2): 47–56.
- 24- Fondjo L. A., Owiredu W. K. B. A., Sakyi S. A. et al.(2017) "Vitamin D status and its association with insulin resistance among type 2 diabetics: A case -control study in Ghana" PLoS ONE; 12( 4): 1–14, ID e0175388.