Journal of Chemical Health Risks

www.jchr.org

JCHR (2024) 14(4), 1744-1749 | ISSN:2251-6727

Serum VIT D Level and Adults Libyans Patients with Acne Vulgaris

[1]Rabab R. Elhassi , [2]Salwa A. ElDibany

[1]Associated Proffesser of Dermatology department, Omar El-Mukhtar University, Al-Beida, Liby

[2]Dermatology department, Omar El-Mukhtar University, Al-Beida, Libya.

(Received: 14 April 2024 Revised: 1 May 2024 Accepted: 18 June 2024)

KEYWORD

Acne vulgaris; vitamin ; Immune system .

ABSTRACT:

Back ground: Acne vulgaris is a common inflammatory skin disease and complex skin disorder that distresses many patients because of its chronicity. Vitamin D plays an important role in the immune system, and Vitamin D deficiency plays a role in many inflammatory skin diseases. It may play a role in pathogenesis of acne vulgaris .

Objectives: The aim of this study was to evaluate the serum 25 hydoxy vitamin D levels among patients with acne vulgaris .

Method: All patients were subjected to detailed history taking and examination to detect extent and severity of acne vulgaris. Adolescents between the ages of 10 and 19 years, of either sex, with acne were clinically examined, and the severity of acne was evaluated using the Global Acne Grading System (GAGS) score.. Blood samples were taken from all participants to assess serum 25 OH D level were measured using a LIASON chemiluminescent Immunoassay. This cross-sectional study was conducted during the period April 2017 to April 2018 .

Result show that the mean ±SD vitamin D level of controls was higher (31.47± 66.19 ng/mL) compared to vitamin D level of diseased cases with a mean value of 19.52±12.38ng/mL). This difference was not significant, P > 0.05 . The study included 24males and 68 females . The mean age of patients were Mean ± SD = 25.5± 8.5, Rang = 11- 50 years, Mode = 18, Median = 24. The mean of vitamin D level for control was more than the acne case, with highly statistical significant (p = 0.003). The study showed that had no a statistical difference between the acne severity and vitamin levels.

1. Introduction

Acne vulgaris is a common chronic inflammatory disease of the pilosebaceous unit, characterized by the formation of non-inflammatory comedones, inflammatory papules, pustules, nodules or cysts **(1)** It is one of the most common skin diseases in a clinical dermatological practice ,occurs in 80-100% of people aged 11-30 years old (2.3]

Acne vulgaris is a multifactorial disease involving androgen-induced increased production of sebum, together with altered keratinization, inflammation and bacterial colonization of hair follicles by propionibacterium (P.) acnes [4]There are many identified etiopathological factors that determine the occurrence of acne vulgaris.Among the traditional causes are disorders of hair follicle keratosis, colonization by *Propionibacterium acnes* (*P. acnes*), overproduction and changes in a composition of sebum. These phenomena lead to the formation of microcomedones a composition of accumulated unexfoliated corneocytes obstructing the follicle ostium, subsequently leading to bacterial colonization and inflammation **(5**) Specific dietary agents and supplements are known to enhance the health and appearance of the skin, by improving immune function at the skin level and providing therapeutic bioactive agents that assist in the treatment of many skin conditions, such as psoriasis, eczema and acne **(6)** Actions demonstrated by vitamin D are in opposition to

Journal of Chemical Health Risks

www.jchr.org

JCHR (2024) 14(4), 1744-1749 | ISSN:2251-6727

the etiological factors responsible for the occurrence and course of acne vulgaris [7]Researches proved that sebocytes are capable to synthesis the endogenous active form of vitamin D and metabolize its exogenous analogs. The vitamin regulates local sebocytes' proliferation and life cycle, also lipid composition, and secretion of inflammatory IL-6 and IL-8 *in vitro*. Moreover, sebocytes do express the vitamin D receptor (VDR) on their cell membranes (8).

(9) The most recent literature reports highlight the immunomodulating effect of this compound, including stimulating immune system cell differentiation and inhibiting the production of proinflammatory cytokines that contribute to the development and progression of inflammatory process in skin diseases (10), (11). Because of the proven impact of vitamin D on numerous disorders and its multiple activities, it is important to sick for its role in skin diseases. Vitamin D counteracts the development and maintenance of inflammation observed at the base of lesion formation**.**

Subjects and Methods

Patients and controls

This study aim to assess serum hydroxy vitamin D in 92 patients diagnosed at the Dermatology Outpatients Acne vulgaris cases were selected from Dermatology outpatient clinic - Elfwayhat - OPD Benghazi . same number controls were selected from same medical outpatient clinic with no acne or abnormal dermatological or systemic findings and included the study.

The acne and control groups were matched by age and gender and Control group included 92 patients or healthy people who did not experience *acne vulgaris* considering . All subjects were excluded if used vitamin D supplements , oral steroids or had not received any treatment for acne vulgaris during the last 6 months . This cross-sectional study was conducted during the period April 2017 to April 2018.

Specimen collection

All the participants gave blood samples after answering a Data collection form for demographics, past medical history, family history, and other relevant variables. From all participants 5 ml peripheral venous blood was drawn to be immediately centrifuged before freezing at −80°C.

Laboratory study

Vitamin D was detected in the form "25 (OH) vitamin D" through LIASON chemiluminescent Immunoassay manufactured and provided. Date Gatheringdata collection form was designed to cover demographics, patients' complaints, severity of *acne vulgaris* by Global Acne Grading System (GAGS), family history, past medical and medication history, treatment seeking history for *acne* and relevant actions, serum vitamin D profile, daily sun exposure rate and vitamin D supplement use. The levels of serum 25 hydoxyvitamin D was measured in each group(40 samples)were collected from patients suffering from acne vulgaris. Acne severity was classified according to Global Acne Grading System (GAGS). In addition (40 samples) were collected from healthy individuals by immunoassay analyzer cobas-e-411-2ed generation platform of Electrochemiluminescence binding assay (ECLIA A).

Ethical Consideration

Approval from the director of the hospital was taken before starting the study as there is no ethical committee

in the hospital. Verbal consent was taken from cases and controls .

Results

The demographic characteristics of acne vulgaris patients are shown in **Table**1,2 Fig1 .Total of 92 patient's participant in this study were with age range from 11-50 years old with mean 25±8.5, about 44.6% of patient with age group 21 -31, majority 68(73.9) of patients were male **,**there were no significant statistical differences between the patient's gender, P value = .635 (not significant) as.

The current study showed that 46(50%) had no acne, the remaining was 21.7% with mild type. **The table 3**; concluded that there was a statistical difference between the case and control in the age, P value = 0.000 (highly significant)However, the study showed that This current reported that there were highly statistical differences (p= 0.000) when compare the mean age between the patients and their control.

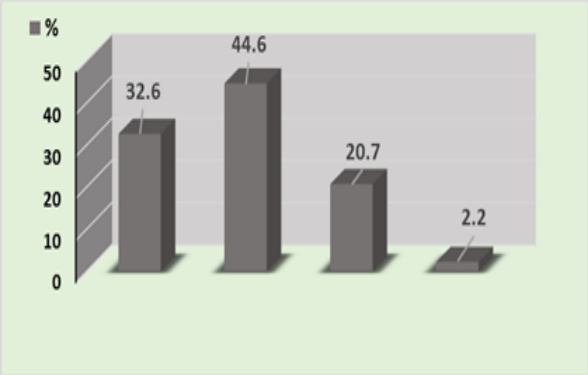
Journal of Chemical Health Risks

www.jchr.org

JCHR (2024) 14(4), 1744-1749 | ISSN:2251-6727

The mean of vitamin D level for control was more than the acne case, with highly statistical significant (p = 0.003).The current study showed that had no a statistical difference between the acne severity and vitamin levels. showed that 46(50%) had no acne, the remaining was 21.7% with mild type**,Table5** Distribution of patients according to difference in age's (age group), and gender ,severity acne mean and vitamin D level in patients.

Figure 1: Distribution of patients according to age / Years



Type	No.	%
No Acne	46	50
Mild	20	21.7
Moderate	8	8.7
Severe	18	19.6
Total	92	100

Table 1: Distribution of patients according to gender with case and control.

Gender	Case	Control	**Total**
Male	11	13	24
Female	35	33	68
Total	**46**	**46**	**92**

Table 2: Distribution of patients according to acne severity**.**

Type	No.	%
No Acne	46	50
Mild	20	21.7
Moderate	8	8.7
Severe	18	19.6
Total	92	100

Table 3: Distribution of patients according to difference in age's mean and vitamin D in case and control patients

Variable	**Case**	**Control**	**P value**
Age/ years (Mean± SD)	21.3±5.6	29.7±8.4	0.000 (HS)*
Vit. D level (Mean± SD)	20.6± 11.9	28.3± 12.3	0.003 (HS)

**** Highly significant***

Table 4: Distribution of patients according to acne severity.

Table5: Distribution of patients according to difference in age's (age group), and s gender of everity acne mean and vitamin D level in patients**.**

Variable	**No.**	**Vit. D level**
Age		
10 – 20	30	19.8±12.3
21 – 31	41	26.6±12
32 – 42	19	27.7±13.5
43 – 53	2	19±5.6
Gender		
Male	24	30.1±15.2
Female	68	22.5±11.1
Acne		

Journal of Chemical Health Risks

www.jchr.org

JCHR (2024) 14(4), 1744-1749 | ISSN:2251-6727

severity		
Mild	20	21.9±11.4
Moderate	8	15.8±10.6
Severe	18	21.4±13.2

Discussion

Globally, acne affects around 650 million persons or near 9.4% of the population.[12}that mainly affects adolescents, has a multifactorial etiology, and involves the formation of papules, pustules, comedones, and cysts on the skin. It is also a chronic disease that has social and psychological effects (13)vitamin D takes a major part in the differentiation and proliferation of keratinocytes.the active vitamin D metabolites target the sebocytes via the nucler vitamin D receptors. Decreased vitamin d level causes alteration in the pattern of pilosebaceous follicular keratinization promoting comedogenesis and exacerbation of acne vlgars[14]. There are several biological mechanisms by which vitamin D induces its anti-inflammatory effects. These mechanisms support the theory of the immune-regulatory function of vitamin D and the anti-inflammatory effects of it in acne patients. Vitamin D inhibits *Cutibacterium acne*-induced Th17 differentiation. Indeed, reducing the expression of IL17 is an inflammatory cytokine that found to be increased in acne patients.11 Vitamin D also reduces the expression of inflammatory cytokines[15] There are few studies reported globally on the relationship between acne vulgaris and vitamin D levels, with varied conclusions

In our study, among both cases and controls, age range from 11-50 years old with mean 25±8.5, about 44.6% of patient with age group 21 -31 The table 3; concluded that there was a statistical difference between the case and control in the age, P value = 0.000 (highly significant). Studies by Seul-Ki Lim et al,[16] Toossiet al,[17]AbdelAal M. et al,[18] Sultana T et al,[19] Yildizgorenet al,[20] and El-Hamd MA et al,[8] also showed similar results. in our study there were highly statistical differences (p= 0.000) when compare the mean age between the patients and their control.

In present study majority 68(73.9) of patients were male ,there were no significant statistical differences between the patient's gender, P value = .635 this same with other study, conducted by Jain *et al.* [21], with 46.4% female participants and 53.6% male participants. In contrast, one study where Females(70%) outnumbered males (30%), similar to other studies [22]

Our results indicated that serum concentrations of vitamin D in controls were significantly higher than those in acne vulgaris patients (P-value = 0.003).the first study in Saudi Arabia concerned with the correlation serum concentrations of vitamin D in controls were significantly higher than those in acne vulgaris patients (P-value = 0.003). These results are in line with several other studies found that no elevation of serum vitamin D levels in acne vulgaris patients., 2425,23 .While other study results indicated lower mean serum vitamin D levels in cases when compared to controls, which were statistically significant. These results were compatible with studies done by Yildizgorenet al,[20] and Alhetheli et al.[26] This is because serum vitamin D3 is reported to suppress the proliferation and stimulate the differentiation of keratinocytes. Thus, vitamin D deficiency may have resulted in comedogenics. [27]In contrast, few studies like those by SeulKi-Lim et al,[28] and Singh et al,[27]showed a higher prevalence of vitamin D deficiency in patients with acne (42.5%) than in healthy controls (27.5%), a finding that was significant. In other study, the vitamin D level in the group of patients with acne was insignificantly high. It is believed that vitamin D, which has an inflammatory characteristic, might have increased due to chronic inflammation in patients with acne.[17] However, Toossi et al, . (29) didn't find any significant difference in serum vitamin D levels between cases and controls... Another study conducted with 43 patients with acne found that the vitamin D level was lower in patients with acne (23). The current study showed that had no a statistical difference between the acne severity and vitamin levels , Toossi et al also observed no correlation between the severity of acne and vitamin D level as well ,The lack of a correlation between serum vitamin D levels and acne, according to Al Taiar *et al.* [14], can be attributed to most of the adolescent participants (65%) having vitamin D insufficiency deficiency (i.e.<20 ng/ml according to the AAP [30] This circumstance could cause the statistical analysis to be ineffective in the evaluation of a correlation of serum vitamin D levels with acne. The examination of serum vitamin D levels

Journal of Chemical Health Risks

www.jchr.org

JCHR (2024) 14(4), 1744-1749 | ISSN:2251-6727

was only performed at one point in time, which cannot reflect the long term status of vitamin D. This method might weaken the relationship of serum vitamin D levels and acne [14]., However, we found a significant negative correlation between vitamin D levels and GAGS scoring of acne which indirectly establishes an inverse relation between vitamin D level and acne severity.however , AbdelAalet al,[18] Seul Ki Lim et al,[28] Singh A et al,[27] and Seul-Ki-Lim et al,[28] specifically found a negative correlation with inflammatory lesions but not with non-inflammatory lesions..

In the current study majority 68(73.9) of patients were male ,there were no significant statistical differences between the patient's gender, P value = .635 (not significant) ,no significant difference was found in the vitamin D levels between males and female sin either control groups or in acne vulgaris patients and this finding is line up with the study which was conducted in 2019 in Egypt by Elmohsenetal .who also revealed adecrease concentration of vitaminD in acne patients.[31] Only few studies are available in the literature examining the correlation between vitamin D and acne. The results of these studies are conflicting.

Conclusion

The present study found highly significant serum vitamin D in healthy controls , indicating the involvement of vitamin D3 in the pathogenesis of acne vulgaris. However, no significant association between the serum level of D and the severity of acne vulgaris Further studies are needed to evaluate the definitive role of vitamin D3 in Acne so that serum vitamin D3 estimation can be used as an early marker in acne patients and considered as an additional treatment of acne with both topical vitamin D analogs and vitamin D supplementation is of significant effect therapy in the management of Acne vulgaris in Dermatolog

Reference

1. Williams HC, Dellavalle RP, Garner S (2012): Acne vulgaris. Lancet, 379: 361-72.
2. Kraning, GF Odland, Prevalence, morbidity, and cost of dermatological diseases. J Invest Dermatol. 1979 Nov;73(5 Pt 2):395-401. PubMed PMID: 501137.
3. Melski JW, Arndt KA. Current concepts: topical therapy for acne. N Engl JMed. 1980 Feb 28;302(9):503-6. PubMed PMID: 6444333
4. illiams HC, Dellavalle RP, Garner S (2012): Acne vulgaris. Lancet, 379: 361-72.
5. Metiko B, Brooks K, Burkhart CG et al.: Is the current model for acne pathogenesis backwards? JAm Acad Dermatol 2015; 72(6): 167.)
6. Boelsma E, Hendriks HFJ, Roza L (2001): Nutritional skin care: health effects of micronutrients and fatty acids. Am J Clin Nutr., 73: 853–864.
7 Lehmann B: Role of the vitamin D3 pathway in healthy and diseased skinfacts, contradictions and hypotheses. Exp Dermatol 2009; 18(2): 97-108.).
8 Mostafa WZ, Hegazy RA: Vitamin D and the skin: Focus on a complex relationship: A review. J Adv Res 2015; 6(6): 793-804
9 Kramer C, Seltmann H, Seifert M et al.: Characterization of the vitamin D endocrine system in human sebocytes in vitro. J Steroid Biochem Mol Biol 2009; 113(1-2): 9-16.
10 Schlager JG, Rosumeck S, Werner RN et al.: Topical treatments for scalp psoriasis: summary of a Cochrane Systematic Review. Br J Dermatol 2017; 176(3): 604-614.
11 Cannell JJ, Hollis BW: Use of Vitamin D in Clinical Practice. Altern Med Rev 2008; 13(1): 6-20.
12.Vos T, Flaxman AD, Naghavi M, Lozano R, Michaud C, Ezzati M, et al Years lived with disability (YLDs) for 1160 sequelae of 289 diseases and injuries 1990-2010: A systematic analysis for the Global Burden of Disease Study 2010 Lancet. 2012;380:2163–96.
13.Bhambri S, Del Rosso JQ, Bhambri A. Pathogenesis of acne vulgaris: recent advances. J Drugs Dermatol. 2009;8(7):615-8
14.Al-TaiarA.AIKhabbazM,RahmanA,Al-Sabah R,ShabanL.Akhtar S.Plasma25-hydroxyvitaminDisnotassociated withacne vulgaris.Nutrients2018;10(10):1525.doi: 10.3390/nu10101525
15.Lee WJ, Choi YH, Sohn MY, Lee SJ, Kim DW. Expression of inflammatory biomarkers from cultured sebocytes was influenced by treatment with vitamin D. Indian J Dermatol. 2013;58(4):327. doi:10.4103/0019-5154.11395913
16.Lim SK, Ha JM, Lee YH, Lee Y, Seo YJ, Kim CD, Lee JH, Im M.Comparison of Vitamin D levels inpatients with and without acne: a casecontrolstudy combined with a randomized controlled trial. PloS one.2016;11:161-162.

Journal of Chemical Health Risks

www.jchr.org

JCHR (2024) 14(4), 1744-1749 | ISSN:2251-6727

17. Toossi P, Azizian Z, Yavari H, Fakhim TH, Amini SH, Enamzade R. Serum 25-hydroxyvitamin D levels in patients with acne vulgaris and its association with disease severity. Clin Cases Miner Bone Metab. 2015;12:238–242
18. Elkamshoushi AM, Elneily DA, Omar SI, Mohamed HM. Serum levels of 25- hydroxyvitamin D and IL17A and their association with acne severity in patients with severe and very severe acne vulgaris. Journal of the Egyptian Women's Dermatologic Society. 2021; 18:15.
19. Sultana T, et al. Evaluation of Severity in Patients of Acne Vulgaris by Global Acne Grading System in Bangladesh. Clin Pathol. 2017,1: 000105
20Yildizgoren MT, Togral AK.Preliminary evidence for vitamin Ddeficiency in nodulocystic acne.Dermatoendocrinol 2014; 6:e983687.
21.Jain RB. Variability in the levels of vitamin d by age, gender, and race/ethnicity: data from National Health and Nutrition Examination Survey 2007-2010. J Nutr Heal Sci 2016;3:203.
22. Sadhika Ganni1, Sathvika Gogineni2, Rama Mani P3, Satya Saka4, Ramya Kakumani2, Dhriti Chugh2Serum Vitamin D Levels in Acne Vulgaris and its Relation to Acne Severity: A Case–Control Study. International Journal of Pharmaceutical and Clinical Research 2023; 15(3); 683-688
23.Yildizgören MT, Torgal AK. Preliminary evidence for vitamin D deficiency in nodulocystic acne. Dermatolendocrinol. 2015;14:6(1):983687-4.
24..Elkamshoushi AM, Elneily DA, Omar SI, Mohamed HM. Serum levels of 25- hydroxyvitamin D and IL17A and their association with acne severity in patients with severe and very severe acne vulgaris. Journal of the Egyptian Women's Dermatologic Society. 2021; 18:15.
25.Toossi P, Azizian Z, Yavari H, Fakhim TH, Amini SH, Enamzade R. Serum 25- hydroxyvitamin D levels in patients with acne vulgaris and its association with disease severity. Clin Cases Miner Bone Metab. 2015;12:238–242.
26.Alhetheli G, AbdElneam AI, Alsenaid A, Al-Dhubaibi M. Vitamin-D Levels in Patients with and without Acne and Its Relation to Acne Severity: A Case-Control Study. Clinical, cosmetic and investigational dermatology. 2020; 13: 759.
27.Singh A, Khurana A, Sardana K, Dixit N, Chitkara A. Correlation of serum 25-hydroxy Vitamin-D and interleukin-17levels with disease severity in acne vulgaris. Indian Journal of Dermatology.2021;66:291
28. Lim SK, Ha JM, Lee YH, Lee Y, Seo YJ, Kim CD, Lee JH, Im M. Comparison of Vitamin D levels in patients with and without acne: a casecontrol study combined with a randomized controlled trial. PloS one. 2016;11:161-162.
29.Toossi P, Azizian Z, Yavari H, Fakhim TH, Amini SH, Enamzade Z. Serum 25-hydroxy vitamin D levels in patients with acne vulgaris andits association with disease severity. Clin Cases Miner Bone Metab. 2015;12(3):238-42.
30.Misra M, Pacaud D, Petryk A, Collett Solberg PF, Kappy M. Vitamin d deficiency in children and its management: a review of current knowledge and recommendations. Pediatrics 2008;122:398-417
31ElmohsenA.Abd El-AzizH,AboMohamed N,DabashA.Assessment ofserum levelof25-HdroxyVitamin DinpatientswithAcne Vulgaris.EgyptJHospMed2019;76(3):3678-83.doi:10.21608/ejhm.2019.39909