

## Assessment of Serum Vitamin B12 Level in Patients with Acne after Isotretinoin Therapy and its correlation to Adverse Mood Changes

M.I.Mohammed<sup>1</sup>, M.M.Mahmoud<sup>2</sup>, W.Mikhael<sup>1</sup> and G.M.Abd El Khalik<sup>1</sup>

<sup>1</sup>Dermatology, Venerology And Andrology, Dept., Faculty of Medicine, Benha Univ., Benha, Egypt

<sup>2</sup>psychiatry, Dept., Faculty of Medicine, Benha Univ., Benha, Egypt

E.mail: dr.manar.feky@gmail.com

### Abstract

Acne is a long-term, debilitating skin condition that mostly affects young people between the ages of 11 and 16, peaking at the age of 16, and lasting into their 20s and 30s. Depression, anxiety, and a lack of enjoyment in life on par with those who suffer from chronically crippling conditions such as asthma, epilepsy, diabetes, and arthritis are all common side effects. Vitamin B12 (cyanocobalamin) has also been linked to acne flare-ups and the emergence of acneiform eruptions, particularly in those with pre-existing conditions. Serum vitamin B12 content in individuals with acne vulgaris was examined in this research to see whether there was a link to probable unfavourable mood changes caused by isotretinoin. Methods: A total of 40 people with moderate to severe acne vulgaris were involved in this investigation. For a period of six months, all patients took oral isotretinoin at a dose of 0.5-2 mg/kg/d. For a complete course, the total cumulative dosage was 120-135 mg/kg. The average age of the participants was 20.8 years. Only 15% of the patients were men, whereas 85% of the patients were women. One-half or more of patients had one or more of the following risk factors: a healthy diet high in sugar, a family history of the disease, or psychological stress. All of the patients evaluated had a problem with their face, with the exception of one. In 5 instances, the back was harmed, but in 65 percent of cases, the course progressed. Thirty-three (72.5 percent) instances were classified as severe, while only eleven (27.5 percent) were classified as light. After using isotretinoin therapy for six months, there was a substantial decrease in blood vitamin B12 concentrations ( $p = 0.0371$ ). Prior to therapy, 13 patients had little depression, 9 patients had mild depression, and one patient had strong depression, according to their pretreatment depression levels. Moderate acne differed significantly from severe acne.  $p = 0.0285$ , the severity of depression. After therapy, 14 patients had minimum depression, 16 had mild depression, and 4 had significant depression, all according to the degree of depression. Patients who received oral isotretinoin for six months showed a significant change in their level of depression before and after treatment ( $p = 0.0371$ ). Patients with acne who are taking isotretinoin for acne may benefit from having their vitamin B12 levels checked to see whether they are at increased risk for depression. Acne patients on isotretinoin and suffering from depression may benefit from vitamin B12 supplementation.

**Key words:** Serum Vitamin B12, Acne, Isotretinoin Therapy.

### 1. Introduction

Acne Chronic inflammation of the pilosebaceous unit is the most common symptom of vulgaris, which mostly affects young people. Non-inflammatory, open or closed comedones and inflammatory papules, pustules, and nodules are the hallmarks of this skin condition. This condition is brought on by androgen-induced increases in sebum production, altered keratinization, inflammation, and bacterial colonisation of hair follicles by *Cutibacterium acnes* [1].

Acne vulgaris is well treated with isotretinoin, which has also been demonstrated to improve overall well-being [2].

Isotretinoin should be used in individuals with acne that is causing physical scarring or psychological discomfort, as well as those with acne that is chronic or severe[3].

One systemic treatment, isotretinoin, provides the benefit of cure but has considerable adverse effects when used at larger doses. Dry skin, nosebleeds, muscular cramps, elevated liver enzymes, and elevated fat levels in the blood are some of the side effects [4].

An association between oral isotretinoin therapy and depressive and suicidal thoughts and behaviour has been demonstrated, however the causality of this association has yet to be established [5].

Even though conclusive information is lacking on how to explain the possible psychological side effects of isotretinoin therapy, the role of serotonin receptors and the impact of retinoids on serotonergic neurons, which may lead to the development of affective disorders, has been hypothesised to play a role [6].

Mental illness may be linked to a deficit of vitamin B12. Isotretinoin therapy's psychological side-effects may be compared to these illnesses [7].

Serum vitamin B12 content in individuals with acne vulgaris was examined in this research to see whether there was a link to probable unfavourable mood changes caused by isotretinoin.

### 2. Patients and Methods

#### Patients

This Acne vulgaris was diagnosed in 40 individuals with moderate to severe cases. They were drawn from the Benha University Hospital's Outpatient Dermatology and Andrology Clinic (during the period from January 2021 to December 2021)

Study Subject Area

A cross-sectional study.

In administration, design is a key component.

An ethical review board for the Benha Faculty of Medicine authorised this investigation.

As a matter of principle,

A signed informed permission was obtained from each patient prior to the collection of blood samples.

Criteria for inclusion

Isotretinoin may be an option for patients with moderate to severe acne vulgaris.

Criteria for excluding someone.

Participants who had any additional dermatological or mental health issues were ruled out of the trial.

Patients who cannot be treated with isotretinoin: Ailments of the hepatic organs (liver cirrhosis, hepatitis).

Either an eye ailment (such as corneal opacity, or keratoconjunctivitis sicca), or an elevated amount of triglyceride in the blood.

- Diabetes.
- Pregnancy and breastfeeding.
- Osteoporosis.

**Methods**

The following procedures were performed on each and every one of the patients.

a signed statement of understanding

This picture was shot before the research began.

Every danger that arose was promptly communicated to the study's participants and the study's committee. Confidentiality was guaranteed for all records. This study's findings were strictly reserved for scholarly purposes only. Patients are free to leave at any time and incur no penalties or lose any advantages as a result of doing so.

Secondly, the whole past is taken into consideration.

The disease's onset, course, longevity, and link to stress were all reported.

Chronic conditions, such as liver disease, diabetes or hypertension, should be disclosed if there is any prior history.

A history of mental health issues.

This is a list of my past drug use.

Exam 3: The general assessment.

Examine the area around you

Dermatological evaluation in the acne patient's home environment

- location, distribution, severity, and duration based on the GAGS score.

All of the patients received oral isotretinoin 0.5-2 mg/kg/day. For a complete course, the total cumulative dosage was 120-135 mg/kg.

There are a variety of tests in the lab to look into this, such as the following: (before starting isotretinoin therapy)

The lipid composition (before starting isotretinoin therapy)

Measuring the level of vitamin B12 in the blood (before and 6 months after starting isotretinoin therapy).

Measurement of vitamin B12 levels in the bloodstream

A total of five millilitres of fasting blood were drawn and placed into evacuated tubes with and without EDTA using normal venipuncture techniques. All samples were centrifuged at 20000 RPM for 5 minutes after being held at room temperature for at least 60 minutes to enable blood clot formation. The samples of plasma and serum were kept at 80°C until they could be analysed. Enzyme-linked immunosorbent assay was used to evaluate the serum vitamin B12 concentrations (ELISA). All procedures were carried out in accordance with the manufacturer's instructions.s instructions.

**3. Results**

The mean age was 20.8 years. Male patients represented 12,5%, while females represented 87,5%

Positive family history, sun exposure, hyperglycemic diet and psychological stress associated with a proximally half of patients

Face was affected in all studied patients , chest in 1 case. While back was affected in 5 cases

According to severity of disease, 29 (72.5%) cases were severe while 11 (27.5%) were mild.

**Table (1)** Clinical data of studied patient: including duration,site of affection, severity & previous treatment.

		Total	N=40	
<b>Duration (years)</b>		<b>Mean</b>	2.9	
		<b>±SD</b>	±0.8	
<b>Site of affection</b>	<b>Face</b>	<b>N</b>	40	
		<b>%</b>	100%	
	<b>Back</b>	<b>N</b>	5	
		<b>%</b>	12.5%	
	<b>Chest</b>	<b>N</b>	1	
		<b>%</b>	2.5%	
<b>GAGS score</b>		<b>Mean</b>	25.8	
		<b>SD</b>	5.63	
<b>Severity according to GAGS score</b>	<b>moderate</b>	<b>N</b>	29	
		<b>%</b>	72.5%	
	<b>severe</b>	<b>N</b>	11	
		<b>%</b>	27.5%	
	<b>Previous treatment</b>	<b>Topical</b>	<b>N</b>	33
			<b>%</b>	82.5%
<b>Systemic</b>		<b>N</b>	21	
		<b>%</b>	52.5%	

A statistically significant change was seen between the levels of vitamin B12 in the blood before and after six months of oral isotretinoin medication ( $p = 0.0371$ ).

After therapy, 14 patients had little depression, 16 patients had mild depression, and four patients had strong depression, according to their post-treatment depression levels. Before and after oral isotretinoin medication for six months, there was a substantially greater difference in depression severity between individuals ( $p = 0.0285$ ).

After six months of using oral isotretinoin therapy, the patient's level of anxiety increased dramatically, as measured by the Beck Anxiety Inventory (BAI).

After six months of medication, there was a significantly negative connection between BDI-II score and serum vit.B ( $r = 0.5925$ ,  $p = 0.00056$ ).

For six months of oral isotretinoin medication, there was no significant change in the juvenile mania rating scale between the patients before and after treatment.

#### 4. Discussion

The average age of the population was 20.8 years old. Only 15% of the patients were men, whereas 85% of the patients were women.

Proximally half of patients have a genetic predisposition for skin cancer because of their family history, sun exposure, high-glycemic diet, and psychological stress

All of the patients evaluated had a problem with their face, with the exception of one. There were five instances like this in the past.

Thirty-three (72.5 percent) instances were classified as severe, while only eleven (27.5 percent) were classified as light.

Acne severity, age and sex of the patients, length of acne lesions, and positive family history were all in the same line in our research. Research conducted by Kang and Yang [12]

As recent investigations have revealed, Isotretinoin affects vitamin B12 and folic acid metabolism despite its high rates of therapeutic effectiveness with isotretinoin, including teratogenicity and mental illnesses [13].

fourteenth and fifteenth

Oral isotretinoin medication for six months reduced vitamin B12 concentrations in the blood significantly ( $p = 0.0371$ ).

Vitamin B12 and folic acid levels may be affected by isotretinoin side effects. 66 acne patients who had been treated with isotretinoin for four months had lower levels of vitamin B12 and folic acid, according to Karadag et al. [16]. In addition to our investigation, Mikkelsen et al., [14] and Sherine et al., [15] observed that vitamin B12 was associated with depressed symptoms [15]

After 45 days of isotretinoin medication, researchers found no difference in vitamin B12 or folic acid levels in 74 acne patients [17]

However, this is still a contentious topic. After 45 days of isotretinoin medication, Schulps et al. [18]

found no significant change in vitamin B12 or folic acid levels in 28 acne patients.

Prior to therapy, 13 patients had little depression, 9 patients had mild depression, and one patient had strong depression, according to their pretreatment depression levels. Moderate acne differed significantly from severe acne. ( $p = 0.0285$ ), the severity of depression.

After therapy, 14 patients had minimum depression, 16 had mild depression, and 4 had significant depression, all according to the degree of depression. For six months of oral isotretinoin medication, there was a significant difference in the degree of depression between patients before and after treatment ( $p = 0.0371$ ).

Following a six-month course of oral isotretinoin treatment, patients reported considerably greater levels of depression than they had before starting the medication.

Another research found that 63.1 percent of 181 patients with facial acne were depressed, while Awad et al. [19] found that patients with acne had greater levels of anxiety and sadness than controls. In our research, Kang et al. [11] found that those with more severe acne were more likely to suffer from depression.

After six months of oral isotretinoin medication, there was a strong negative association between the level of depression and the amount of Vitamin B12 in the blood ( $p = 0.00056$ ).

Depression becomes worse when the amount of Vit.B12 in the body decreases.

Prior to therapy, 21 patients had mild anxiety, 16 had moderate anxiety, and 3 had anxiety levels that may be considered significant by the treating physician.

With regard to one's level of nervousness After therapy, 8 patients had a low level of anxiety, 23 patients had moderate anxiety, and 9 patients had potentially serious levels of anxiety. Before and after oral isotretinoin medication for six months, there was a significant change in patients' anxiety levels ( $p = 0.0065$ ).

After six months of oral isotretinoin medication, the level of anxiety was much greater than previously.

Prior to therapy, mania predicated that 29 individuals had no manic symptoms, 10 had mild manic symptoms, and one had moderate to severe symptoms.

Treatment resulted in mania in 24 individuals with no manic symptoms, 14 patients with mild manic symptoms, 2 patients with moderate to severe manic symptoms. Treatment with oral isotretinoin for six months had no effect on the patient's manic severity ( $p = 0.4790$ ).

After six months of oral isotretinoin medication, the level of depression was much greater than previously.

Patients with mild acne were given isotretinoin, while those with severe acne were given vitamin C in a randomised, double-blind, placebo-controlled research (21 with isotretinoin, and 18 with vitamin C). None of the psychological tests (MPS, BDI, STAI, and APSEA) showed a significant difference between the isotretinoin-treated group and the control group in

moderate and severe acne patients. Depression and anxiety symptoms were not exacerbated by isotretinoin therapy of moderate to severe acne [20].

Isotretinoin medication and a topical treatment were compared for four months in another research of acne patients' quality of life, anxiety and depressive symptoms, respectively. Dermatology Life Quality Index (DLQI), BDI, and Hospital Anxiety & Depression (HAD) ratings were comparable between the two groups at baseline. In contrast to the isotretinoin group, the topical therapy group had considerably worse quality of life at the conclusion of the second month. By the conclusion of the fourth month, the isotretinoin group's quality of life and all of their psychological test scores had improved much more. Isotretinoin therapy did not lead to an increase in depressive and anxious symptoms compared to the topical group [7].

According to the guidelines issued by Goodfield et al. [21] in the British Journal of Dermatology and they recommend: first, an inventory of mental histories for all patients who may be prescribed isotretinoin. Patients and their loved ones must also be aware of the possibility of mood swings. Finally, during every clinic appointment, patients should be asked about their psychological issues.

## 5. Conclusion

Patients using isotretinoin for acne should be screened for vitamin B12 deficiency to see whether they are at risk for depression. Acne patients on isotretinoin and suffering from depression may benefit from vitamin B12 supplementation.

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