

Effects of Isotretinoin on Serum Vitamin-D Levels among Severe Acne Vulgaris patients

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ABSTRACT

Background: Medical issue that causes inflammation of skin resulting in psychological and social distress is acne vulgaris. Vitamin D plays a critical role in its pathology due to its immune-modulatory effects.

Aim: To evaluate the effects of isotretinoin on vitamin D levels among severe acne vulgaris patients.

Study design: This was quasi experimental trial.

Methodology: This experiment at the Lahore General Hospital involved 100 participants with severe acne vulgaris. Iso-tretinoin in a dose of 0.75 mg/kg was given daily for 4 months. Serum Serum vitamin-D levels were considered at two points: before and after treatment. The data was entered and analyzed in SPSS 25. A paired sample t-test was used to compare the mean Vitamin-D levels before and after treatment in acne vulgaris patients. A p-value ≤ 0.05 was considered significant.

Results: The mean age of the patients was 28.5 \pm 6.2 years. There was significant difference in mean Vitamin D serum levels before and after treatment in acne vulgaris patients.

Practical Implication: Acne vulgaris is a major problem in modern era. This investigation will highlight the role of oral isotretinoin on vitamin D levels among severe acne local patients. Due to lack of local literature, this study will add information to existing literature. **Conclusion:** It was concluded that isotretinoin treatment increased 25 OH vitamin D levels in patients suffering from severe AV. Although acne vulgaris impacts negatively to vitamin-D levels.

Keywords: Acne Vulgaris, Isotretinoin, Effectiveness and Treatment Outcomes.

INTRODUCTION

Acne vulgaris (AV) is a common health issue that causes inflammation of skin resulting in psychological and social distress. Various factors contribute to its pathology that include sebaceous hyper-secretion and *Cutibacterium acnes* colonization^{1,2}. Various hormones like testosterone secretion and low vitamin-D levels activate sebaceous glands. These factors provide favorable lipid-rich, anaerobic environment to *C. acnes* growth as revealed by many previous studies^{3,4}. This disease results from sebaceous follicles involvement thus producing pimples mainly affecting face, chest and back of the victims⁵. This disease occurs after pubertal spur as sebum production rises due to change serum sexual hormones levels among both males and females thus both genders face this health issue⁶.

This disease is mainly due to proliferation of *Propionibacter acnes* that leads to local inflammation with pustules creation⁵⁻⁷. There are several documented complications that develop like erythema, post-inflammatory hyper-pigmentation (PIH) and scars⁶. Above mentioned outcomes make life of victims hard and depressing hence they seek health providers and physicians for treatment and advice. It can be mild, moderate or severe but according to literature review moderate acne victimizes 15-20% of adult population globally in their life once⁸⁻¹⁰.

Vitamin D plays a critical role in its pathology due to its immune-modulatory effects.² Literature review revealed that ultraviolet sunlight rays synthesize vitamin D. Isotretinoin has been implicated as pharmacological treatment option for severe acne as it binds to retinoid receptors³. Acne vulgaris is a major problem in modern era. This local investigation highlighted the role of oral isotretinoin on serum vitamin D levels among severe acne patients.

Due to lack of local literature, this study was performed with aim to evaluate the effects of isotretinoin on vitamin D levels among severe acne vulgaris patients.

METHODOLOGY

Quasi experimental trial held at the Lahore General Hospital that enrolled 100 severe acne vulgaris patients. Iso-tretinoin in a dose

of 0.75mg/kg was given daily for 4 months. Serum Serum vitamin-D levels and adverse effects were considered at two points: before and after treatment. All patients were advised to apply sunscreens before sun exposure. Permission was granted by Hospital Ethical Review Board.

Samples were centrifuged and later stored at -80 °C till further analysis. Serum levels of 25 OH vitamin-D were measured using an ELISA kit. All data was collected in performa. Written consent was taken at start of treatment. Both male and unmarried females between 18-38years having diagnosis of severe AV by using GAGS with skin types IV and V were included in current study. Individuals suffering from any hepatic/renal failure or taking vitamin D supplements before start of study were excluded.

The sample size of 100 cases was calculated by the following formula keeping the power of study equal to 80% and the confidence level equal to 95% with the expected mean vitamin D levels before treatment as 15.3 \pm 3.2 and 16.7 \pm 3.8 after treatment¹¹.

Statistical analysis: The data was entered and analyzed in SPSS 25. Mean \pm SD were given for numeric data i.e., age, Vitamin D levels. The frequency and percentage were calculated for categorical data i.e., gender. A paired sample t-test was used to compare the mean Vitamin D levels, Cholesterol, Triglycerides, AST and ALT before and after treatment in acne vulgaris patients. A p-value ≤ 0.05 was considered significant.

RESULTS

The mean age of the patients was 28.5 \pm 6.2 years. There were 68(68%) females and 32(32%) male patients as shown in figure-1. Result indicated that there was significant difference in mean Vitamin D serum levels before and after treatment in acne vulgaris patients as shown in Table-1 and figure-2.

Table-1: Comparison of Vitamin D levels before and after treatment

Parameters	Vitamin D serum level, ng/mL
Before treatment	15.5 \pm 2.8
After treatment	23.9 \pm 2.7
Men change increase	8.4 \pm 2.2
P value	<0.001*

*Statistically significant

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Figure 1: Gender distribution

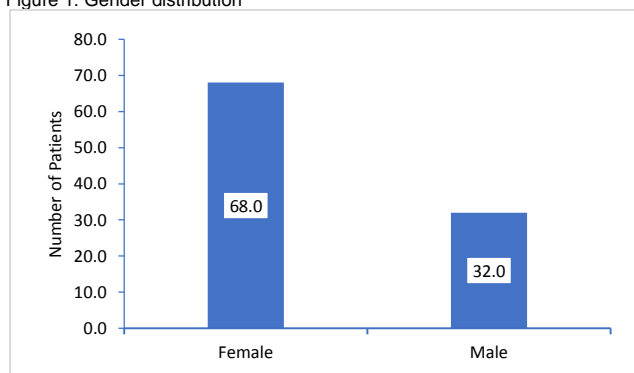
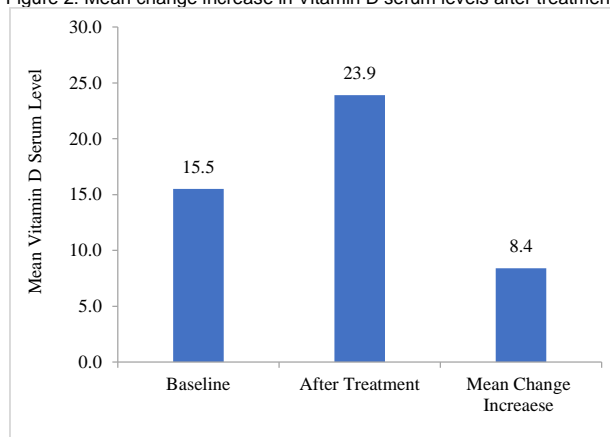


Figure 2: Mean change increase in Vitamin D serum levels after treatment

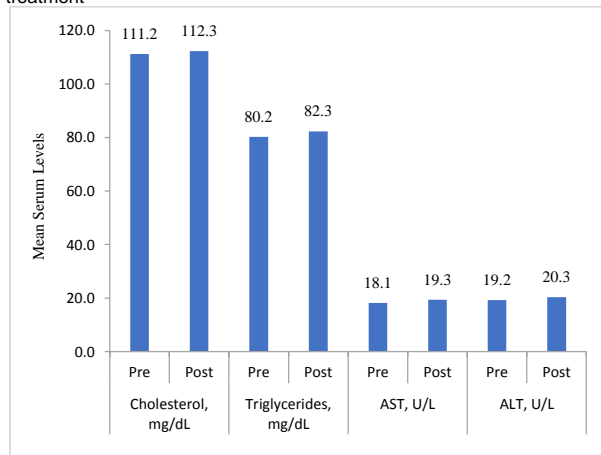


Results revealed that insignificant difference in mean cholesterol, triglycerides, AST and ALT serum levels before and after treatment in acne vulgaris patients as shown in Table-2 and Fig. 3.

Table 2: Lipid and Hepatic profile before and after treatment in Acne Vulgaris patients

Parameters	Before Treatment	After Treatment	p-value
Cholesterol, mg/dL	111.2 ± 5.7	112.3 ± 7.7	0.096
Triglycerides, mg/dL	80.2 ± 9.9	82.3 ± 11.8	0.068
AST, U/L	18.1 ± 4.3	19.3 ± 4.4	0.065
ALT, U/L	19.2 ± 4.2	20.3 ± 4.3	0.060

Figure 3: Mean Cholesterol, Triglycerides, AST and ALT before and after treatment



DISCUSSION

Many studies that have documented the role of vitamin D in pathology of acne. It plays a pivotal role in strengthening of immune system. It causes the growth of many cells (sebocytes and keratinocytes) thus causing their proliferation with differentiation¹². It has many characteristics like anti-comedogenic and antioxidant effects by binding to intra-nuclear vitamin D receptor (VDR).

In current study, there were 100 cases with 50 patients in each group while females were in majority (Fig. 1). In one previous study, number of patients were less (n=68) but similarly, females were in majority¹². Thus our study was in line with previous study in terms of enrollment.

In current study, method of enrollment, inclusion and exclusion criteria was followed as done in one study with mild modifications⁹. In current study, serum vitamin D were measured before and after treatment and treatment was given for 4 months on daily basis with isotretinoin. Paradoxically, one study measured serum vitamin D levels before, during and after treatment at 3 months with iso-tretinoin. Hence, assessment duration and sample collection time were different from our study^{10,12}.

Results revealed that insignificant difference in mean cholesterol, triglycerides, AST and ALT serum levels before and after treatment in acne vulgaris patients as shown in Table-2 and figure-3. Similarly, in many studies, serum lipid and hepatic profiles showed insignificant difference before, during and after treatment with retinoic acid^{8,11}. Hence our results were in line with previous studies.

Result in current study, indicated that there was significant difference in mean Vitamin D serum levels before and after treatment in acne vulgaris patients as shown in Table-1 and figure-2. Similarly, one study showed significant change in serum vitamin-D levels after treatment with isotretinoin with p value of <0.001.¹² Hence our results supported the findings observed by previous researchers.

Limitations: Single centered study with small sample size per group limited our findings and lack of genetic workup was another limitation. Hence more studies with larger sample size, genetic workup and different ethnic groups are recommended to produce uniformity in results.

CONCLUSIONS

It was concluded that isotretinoin treatment increased serum vitamin-D levels in patients of severe AV. Although acne vulgaris impacts negatively to vitamin-D levels. Isotretinoin is still a reliable treatment option for severe cases of acne.

Author's contribution: MA: Overall supervision and Write up and literature review. TL: Statistics application, analysis literature review, help in write up.

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