JOURNAL OF CRITICAL REVIEWS

ISSN- 2394-5125 VOL 8, ISSUE 01, 2021

EFFECT OF NARROW BAND ULTRAVIOLET B ON THE SERUM LEVEL OF 25-HYDROXYVITAMIN D IN VITILIGO PATIENTS

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Abstract:

Introduction: Vitiligo is a common acquired depigmentary disorder of the skin and mucosa, which is caused by loss of functioning melanocytes.Recently there has been growing interest in the role of vitamin D3 in the pathomechanism of vitiligo and its relevance in the treatment of vitiligo.

Aim of the work: to evaluate the serum level of 25-hydroxy vitamin D in patients with vitiligo before and after NB-UVB therapy and correlation of this with re-pigmentation in vitiligo patients.

Patients and Methods: 40 patients with vitiligo treated with NB-UVB for 12 weeks, vitiligo area severity index was be measured at 0 week and 12 weeks, and serum level of 25 (OH) D was measured at same intervals.

Results: The mean vitamin D level improved from a mean of 14.2 mg/dL to 16.2 mg/dL. VASI score improved from a mean of around 9 before treatment to as less as 7.125 after treatment. We found a positive and significant correlations between VASI scores and vitamin D levels both before (correlation coefficient: 0.395; P value = <0.001) and after treatment (correlation coefficient: 0.412; P value = <0.001). We found a negative correlation between disease duration and the change of VASI.

Conclusion: Cumulative doses of NB-UVB therapy improve low vitamin D levels in patients with vitiligo, which might have a role in NB-UVB-induced repigmentation.

Introduction:

Vitiligo is a common acquired depigmentation of the skin and mucous membrane, caused by melanocyte loss of function. It is characterized classically with well-confined hypopigmented macules and/or patches. This can affect any part of the body and leads to great impact on the patients' quality of life. [1]

Many theories tried to explain the pathogenesis of vitiligo; including melanocyte destruction (due to autoimmune disorders, cytotoxic mechanisms, and an intrinsic melanocyte defects), oxidant-antioxidant imbalance and neural mechanisms. However, the exact etiology is still unclear[2]. In the last years, there is a growing interest regarding the role of vitamin D3 in the pathogenesis of vitiligo and also the potential role of vitamin D3 in the treatment of vitiligo[3]

Available data proposes that vitamin D3 is a potent immunosuppressive; and hypovitaminosis D may be associated with many autoimmune disorders including vitiligo. However, we do not know the exact cause of low vitamin D3 in patients with autoimmune diseases[4]

Vitamin D controls the activation, proliferation, and migration of melanocytes by increasing melanogenesis and the tyrosinase content of cultured human melanocytes through its antiapoptotic effect and also decreases the autoimmune damage of melanocytes by modulating T-cell activation[5]

Narrow band ultraviolet B has become an important therapy for vitiligo since first introduced by Westerhof and Nieuweboer-Krobotova in 1997. The mechanism of action of NB-UVB in vitiligo is by suppression of the immune system and stimulation of melanocyte proliferation in the skin and the outer root sheath of hair follicles[6]

Exposure of skin to sunlight (mainly UVB) contributes to over 90% of the serum concentration of 25-Hydroxy vitamin D in the human body[7]

Subjects and Methods:

40 patients with vitiligo" were be treated with NB-UVB for 12weeks.
Vitiligo area severity index was be measured at 0 week and 12 weeks.
Serum level of 25 (OH) D was measured at 0 weeks and 12 weeks in patients

Statistical analysis:

Statistical package for social sciences (SPSS), version 24 (IBM- Chicago, USA; May 2016) was used for statistical analysis. Data expressed as mean, standard deviation (SD), number and percentage. Paired t test was used to compare

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means of quantitative variables at different time intervals. Pearson correlation test was used to compare two quantitative variables. A p value of <0.05 was considered significant

Results:

Regarding the gender of the study group, we found that most of the cases were females, with only 11 cases (27.5%) were males.

Regarding the age of the study group, we found that the age of the included cases ranged widely from 17 to 71 years, with a mean of 45.4 years.

As regard the marital status of the study group, we found that most of the cases were married, with only 11 cases were either single (5 cases), widow (5 cases) or divorced (one case).

Regarding the duration of the vitiligo, we found that the mean duration of vitiligo was around 18.5 months, with a very wide range from 2 months to up to 7 years.

Regarding the family history within the study group, we observed that 20% of the cases had family history of vitiligo (8 patients) and 27.5% of them had a family history of autoimmune diseases (11 patients).

Regarding the vitamin D level before and after UV therapy, we found that the mean vitamin D level improved from a mean of 14.2 mg/dL to 16.2 mg/dL. This improvement was highly significant statistically (p value = <0.001)(Table 1).

Regarding the vitamin D difference post-treatment, we found that the majority of cases (90%) showed improved vitamin D level after treatment **(Table 2).**

Regarding VASI score, we found that VASI score improved from a mean of around 9 before treatment to as less as 7.125 after treatment. This improvement was highly significant statistically **(p value = <0.001)(Table 3).**

Regarding the VASI score difference post-treatment, we found that the majority of cases (90%) showed improved VASI score after treatment, while 2 cases did not improve and another 2 showed worsened VASI score **(Table 4).**

Regarding the correlation between VASI and Vitamin D, we found that there were positive and significant correlations between VASI scores and vitamin D levels both before **(correlation coefficient: 0.395; P value = <0.001)** and after treatment **(correlation coefficient: 0.412; P value = <0.001) (Figure 1 & 2).**

Regarding the correlation between duration and VASI, we found that there was positive and significant correlation between VASI scores before treatment and disease duration, which means that the more the disease duration, the higher the VASI score.

This was lost after treatment, with positive and non-significant correlation between VASI and disease duration.

On the other hand, we found that there is a negative correlation between disease duration and the change of VASI, which means that; the longer the disease duration, the more improvement of VASI, but this was non-significant **(Table 5) (Figure 3,4&5).**

Table 1: Vitamin D level before and after UV therapy

	25 (OH) vit D at 0 time	25(OH) vit D at 12 week	Vitamin D difference
Mean	14.232	16.151	1.916
Std. Deviation	5.554	5.943	2.085
Median	13.785	14.940	1.835
Minimum	5.44	6.11	-4.54
Maximum	26.44	30.12	8.40

Paired t test = 5.822, p value = <0.001 (Highly significant difference).

Table 2:Vitamin D difference

		Frequency	Percent
Vitamin D	Worsened	4	10.0
	Improved	36	90.0
	Total	40	100.0

Table 3: VASI score

	VASI score at 0 time	VASI score at 12 week	VASI score difference
Mean	8.975	7.125	-1.850
Std. Deviation	3.906	3.291	1.369
Median	8	6	-2
Minimum	4	3	-5
Maximum	20	15	1

Paired t test = 8.546, p value = <0.001 (Highly significant difference).

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Table 4:VASI score difference

		Frequency	Percent
VASI score	Improved	36	90.0
	No change	2	5.0
	Worsened	2	5.0
	Total	40	100.0

Table 5: Correlation between disease duration and VASI

	Correlation coefficient with disease duration	P value
VASI before treatment	0.338	0.033
VASI after treatment	0.276	0.085
VASI change	-0.302	0.059

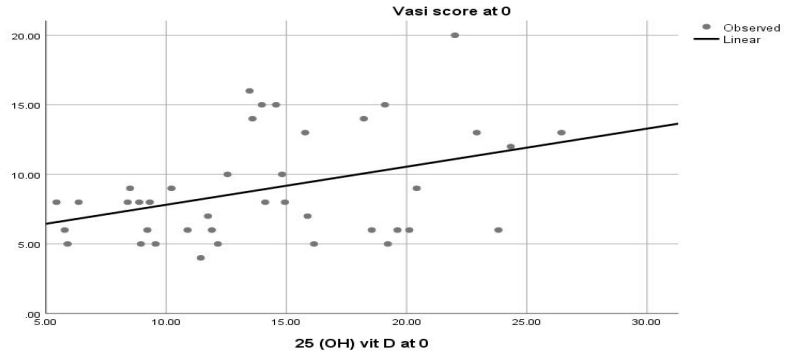

Figure 1: Correlation between VASI and Vitamin D

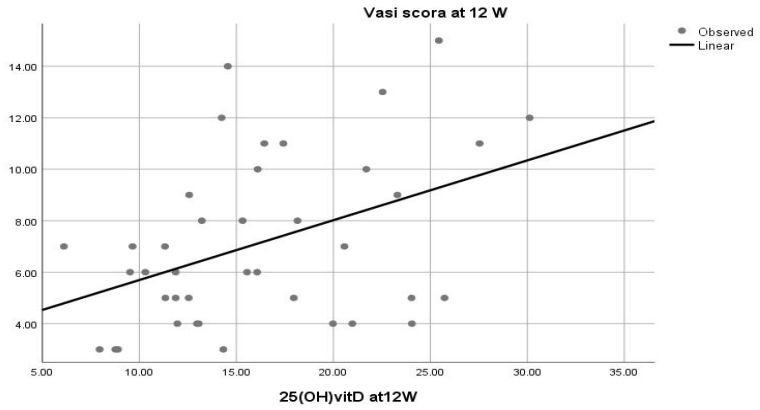

Figure 2: Correlation between VASI and Vitamin D

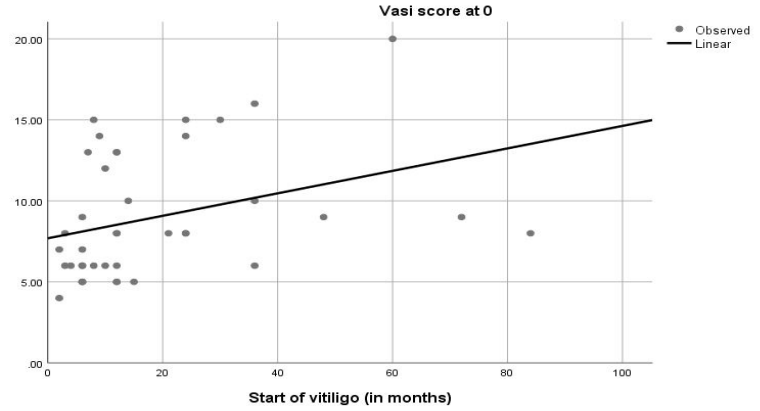

Figure 3: Correlation between disease duration and VASI

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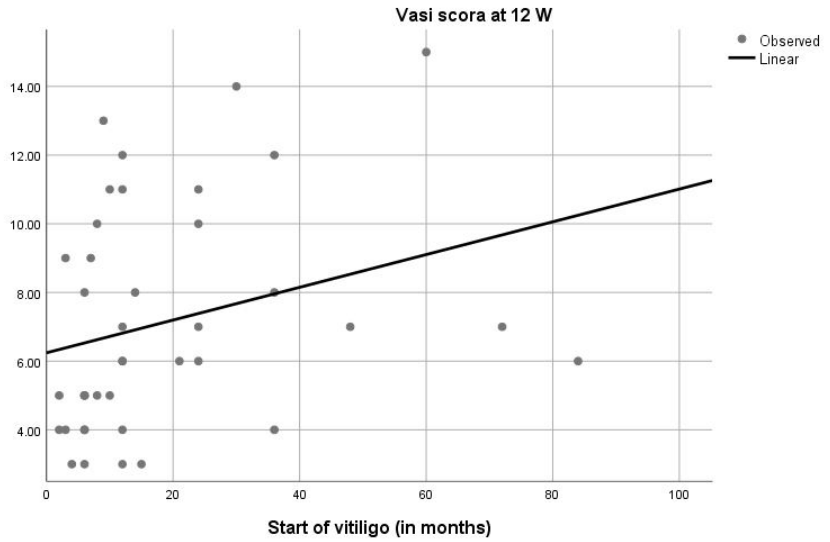

Figure 4: Correlation between disease duration and VASI

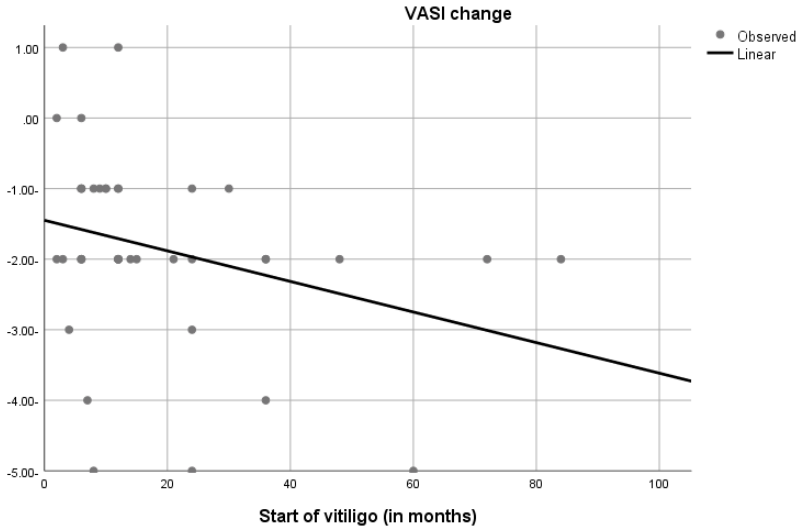

Figure 5: Correlation between disease duration and VASI

Discussion:

Vitiligo is a common acquired disorder of the skin and mucous membrane caused by loss of functioning melanocytes[1].

Our study aimed to evaluate the serum level of 25- hydroxyvitamin D in patients with vitiligo before and after NB-UVB therapy and correlation of this with repigmentation in vitiligopatients .

Our study included 40 patients with vitiligo that were be treated with NB-UVB for 12 weeks. Vitiligo area severity index was be measured at 0 week and 12 weeks. Serum level of 25 (OH) D was measured at 0 weeks and 12 weeks in patients.

Regarding the gender of the study group, we found that most of the cases were females, with only 11 cases (27.5%) were males. But, in Ibrahim et al.2018 study[1], 80 adults patients were included; 40 patients were male and 40 patients were female.

Regarding the age of the study group, we found that the age of the included cases ranged widely from 17 to 71 years, with a mean of 45.4 years. But in Ibrahim et al.2018 study[1], their ages ranged from 19 years to 55 years with a mean of 34.27 years.

As regard the marital status of our study group, we found that most of the cases were married, with only 11 cases were either single (5 cases), widow (5 cases) or divorced (one case).

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Regarding the duration of the vitiligo, we found that the mean duration of vitiligo was around 18.5 months, with a very wide range from 2 months to up to 7 years.

Regarding the family history within the study group, we observed that 20% of the cases had family history of vitiligo (8 patients) and 27.5% of them had a family history of autoimmune diseases (11 patients).

Regarding the vitamin D level before and after UV therapy, we found that the mean vitamin D level improved from a mean of 14.2 mg/dL to 16.2 mg/dL. This improvement was highly significant statistically (p value <0.001).

Also, In Ibrahim et al.2018 study[1], the mean pre-treatment level of vitamin D3 was 34.64±3.03 nmol/L. Similar to our study, the levels of vitamin D3 at 12 weeks follow up showed significant improvement, with a mean of 49.77±2.79 nmol/L; P value < 0.001.

Also, El-hanbuli et al. 2018[8] found that the level of serum vitamin D3 level was significantly higher among vitiligo patients at 12 weeks after NB-UVB therapy (20.87±15.08) compared to the pre-treatment mean of (14.69 ±14.05); p value < 0.001.

Our results were in accordance with Sehrawat et al[3] and Lim et al studie.[9]

Regarding the vitamin D difference post-treatment in our study, we found that the majority of cases (90%) showed improved vitamin D level after treatment.

Regarding VASI score, we found that VASI score improved from a mean of around 9 before treatment to as less as 7.125 after treatment. This improvement was highly significant statistically (p value = <0.001).

Also, in Ibrahim et al. 2018 study[1], in comparison with VASI before starting the phototherapy and after 24 weeks, the mean was 4.37±0.455 to 3.54±0.401. Their results were similar to our study results and also were statistically significant.

Regarding the VASI score difference post-treatment, we found that the majority of cases (90%) showed improved VASI score after treatment, while 2 cases did not improve and another 2 showed worsened VASI score.

Regarding the correlation between VASI and Vitamin D, we found that there were positive and significant correlations between VASI scores and vitamin D levels both before (correlation coefficient: 0.395; P value = <0.001) and after treatment (correlation coefficient: 0.412; P value = <0.001).

In Ibrahim et al. 2018 study[1], they found that correlation between the mean VASI before starting the phototherapy and the mean vitamin D3 levels was poor negative and non significant correlation (P value = o.73) among patients with vitiligo. After 24 weeks of phototherapy, VASI scores showed reduction and there was increase in repigmentation; and the correlation between the mean VASI and mean vitamin D3 levels was strong, negative and non significant correlation (P value = 0.325).

Regarding the correlation between duration and VASI, we found that there was positive and significant correlation between VASI scores before treatment and disease duration, which means that the more the disease duration, the higher the VASI score.

This was lost after treatment, with positive and non-significant correlation between VASI and disease duration.

On the other hand, we found that there is a negative correlation between disease duration and the change of VASI, which means that; the longer the disease duration, the more improvement of VASI, but this was non-significant.

Our results are in agreement and support of many previous studies that found an increase in the levels of vitamin D3 by treatment with NB-UVB [2, 10, 11]

There was an agreement with previous studies[12-14] which showed that VASI scores improved significantly with the rise in the cumulative dose of NB-UVB. There was an increase in the levels of vitamin D3 with NB-UVB treatment and reduction in VASI scores and increased repigmentation as shown by Sehrawat et al. study[3].

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