

## ROLE OF NARROW-BAND UVB IN THE TREATMENT OF GENERALIZED VITILIGO IN MOSUL

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### ABSTRACT

**Background:** Vitiligo is a stigmatizing disorder that can cause cosmetic disfigurement and cause severe psychological issues in daily life. About 0.5% of the world's population experiences it, and males experience it just as frequently as girls. The UV radiation's well-established immune-modulatory effects may account for the stability of both local and systemic aberrant immunological responses. **Aim of the study:** To demonstrate the effects of NB-UVB in the treatment of Vitiligo. **Patients and Methods:** This prospective case-series study includes 50 patients with generalized Vitiligo who attended the Dermatology Unit at Al-Salam Teaching Hospital. After examination, the objective of the study was discussed with the patients and verbal consent was taken for the participation in the study. The patients were referred to the researcher private clinic for the treatment. Therapy was administered three times per week on nonconsecutive days and a standard initial dose of 280 mJ/cm<sup>2</sup> was started in all patients and the study period extended for 12 months; from June 2021 to May 2022. **Results:** The mean age is 19.4± 3.2 years. Seventeen patients are males and thirty three are females with a Female: male ratio is 1.94:1. Most of males and female are below the age of 20 years; 29.4% and 35.3% of males are at the age group (≤10 years) and (11-20 years) respectively. The females at the (≤10 years) age group are 21.2% and at the (11-20 years) age group are 51.5%. The mean duration is 9.4±1.1 years with a range of 0.5-17 years. 7(14.0%) of the patients have excellent response, 19(38.0%) good response, 14(28.0%) moderate response, while 10(20.0%) have poor response. Most of the patients 45 (90.0%) did not report any side effect. The recorded side effects are mild erythema is 2(4.0%), pruritis 1(2.0%), burning pain 1(2.0%), and xerosis 1(2.0%). **Conclusion:** Many patients had re-pigmentation quickly as a result of this therapy regimen. This data supports earlier studies by showing that narrow-band UVB is an effective and well-tolerated treatment for vitiligo.

**KEYWORDS:** Narrow-band UV, Phototherapy, Vitiligo.

### INTRODUCTION

The skin condition known as vitiligo is acquired and is characterized by the loss of pigment-producing cells from the epidermis, which results in distinct, frequently symmetrical white patches. Lesional skin is more vulnerable to sunburn because it lacks melanin pigment.<sup>[1]</sup>

Vitiligo is a stigmatizing disorder that can cause cosmetic disfigurement and cause severe psychological issues in daily life. About 0.5% of the world's population experiences it, and males experience it just as frequently as girls.<sup>[1,2]</sup>

Although lesions can develop at any age, the typical onset age is around 30.<sup>[3-5]</sup> The prevalence varies locally

and ranges from 0.5-2.0% globally, and the prevalence rates for adult populations are comparable to those for children and adolescents.<sup>[6]</sup> In Iraq, the prevalence of dermatomes has risen from 33.5% in 1987.<sup>[7]</sup> to 40.9% in 2010.<sup>[8]</sup> Pigmentary disorders were the third ranking dermatosis in Baghdad governorate, 118 cases (17.8%) out of 663; vitiligo was the most common in 8.3% of patients.<sup>[9]</sup>

It is unclear what causes vitiligo specifically. It frequently occurs in conjunction with certain autoimmune disorders. Its pathophysiology is the subject of numerous theories, and its etiology is complex. Multiple susceptibility loci, genetic variability, and imperfect penetrance are its defining traits. Studies on families and twins have demonstrated that inheritance is

complicated and involves both genetic and environmental influences.<sup>[10]</sup>

Recent studies have shown that narrow-band ultraviolet B (NBUVB) phototherapy is a reliable and secure method of treating vitiligo.<sup>[11]</sup> NBUVB phototherapy's exact mechanism of action is not well understood. Similar to PUVA therapy, NBUVB may have its effects on vitiligo in a two-step procedure that can both happen at the same time.<sup>[12,13]</sup>

- (i) The stabilization of the de-pigmentation process
- (ii) The stimulation of residual follicular melanocytes.

UV radiation's well-established immune-modulatory effects may account for the stability of both local and systemic aberrant immunological responses.<sup>[14]</sup> Additionally, it's possible that NBUVB, like PUVA therapy, mimics the dopa-negative, amelanotic melanocytes in the outer hair root sheaths, which are stimulated to multiply, create melanin, and move outward to correct skin that has lost its color, causing perifollicular re-pigmentation.<sup>[13,14]</sup> Imokawa *et al* findings<sup>[15]</sup> that UVB irradiation increased the expression of endothelin-1, interleukin-1, and tyrosinase in human keratinocytes in vitro and in vivo after UVB exposure, which is significant in melanocyte mitogenesis, melanogenesis, and melanocyte migration, suggesting yet another potential mechanism of UVB-induced re-pigmentation. There are only a few articles that have been published in the literature that describe the clinical experience with NBUVB in vitiligo. The majority of earlier research that was reported focused on the western population, and they had little to no experience with darker racial groups like Indians.<sup>[16,17]</sup>

Aim of the study to demonstrates the effects of NBUVB in the treatment of Vitiligo.

**PATIENTS AND METHODS**

This prospective case-series study includes 50 patients with generalized Vitiligo who attending the Dermatology Unit at Al-Salam Teaching Hospital. After examination, the objective of the study was discussed with the patients and verbal consent was taken for the participation in the study. The patients were referred to the researcher private clinic for the treatment. Any local or systemic immunosuppressive therapy taken by the patients was stopped for period of at least 8 weeks before starting phototherapy. Therapy was administered three times per week on nonconsecutive days and a standard initial dose of 280 mJ/cm<sup>2</sup> was started in all patients and the study period extended for 12 months; from June 2021 to May 2022. The affected areas were exposed and the genital region was protected throughout each treatment. In every additional visit a 20% rise in the irradiation dose was done. The minimal amount of erythema in the lesions signaled the achievement of the ideal constant dose. If any symptomatic erythema (burning, discomfort, blistering) or erythematous lesions appeared, the irradiation dose will be reduced by 20%. During

treatment, the eyes were protected by UV-blocking goggles. Patients were advised to apply sunscreen on exposed areas and to protect their skin from excessive sun exposure. Once 75% re-pigmentation had been achieved, the frequency of treatment was tapered to twice weekly until 100% re-pigmentation was achieved or till the end of study period, whichever was earlier. Clinical assessment was done regularly b the researcher.

Response to treatment was assessed by comparing the area of lesional re-pigmentation at the end of a course of therapy. Based on the area of re-pigmentation, the treatment outcome was classified as marked to complete (> 75.0%), moderate (50.0–75.0%), or mild (< 50.0%) re-pigmentation.

**RESULT**

The study includes 50 patients who presented with Vitiligo. The mean age is 19.4± 3.2 years. Seventeen patients are males and thirty three are females with a Female: male ratio is 1.94:1.

Table (1) demonstrates the distribution of the study sample according to age and gender and shows that Most of males and female are below the age of 20 years; 29.4% and 35.3% of males are at the age group (≤10 years) and (11-20 years) respectively. The females at the (≤10 years) age group are 21.2% and at the (11-20 years) age group are 51.5%.

**Table (1): The distribution of the study sample according to age and gender.**

Age groups	Gender		Total No. (%)
	Males No. (%)	Females No. (%)	
≤10 years	5(29.4)	7(21.2)	12(24.0)
11-20 years	6(35.3)	17(51.5)	23(46.0)
21-30 years	3(17.6)	5(15.2)	8(16.0)
31-40 years	2(11.8)	3(9.1)	5(10.0)
≥ 41 years	1(5.9)	1(3.0)	2(4.0)
<b>Total</b>	<b>17</b>	<b>33</b>	<b>50(100.0)</b>

Figure (1) demonstrates the duration of the Vitiligo among the study sample and shows that the mean duration is 9.4±1.1 years with arrange of 0.5-17 years.

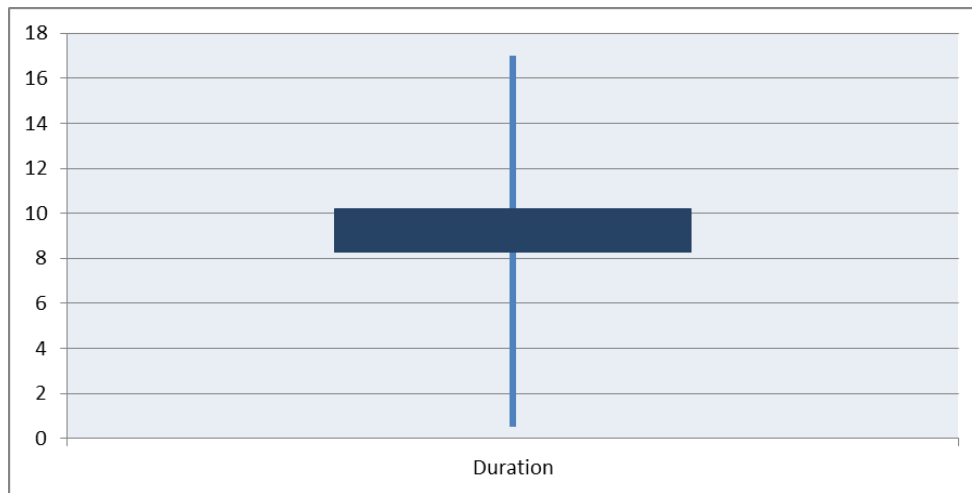


Figure (1): The duration of the Vitiligo among the study sample.

Table (2) demonstrates the response to the treatment and shows that 7(14.0%) of the patients have excellent

response, 19(38.0%) good response, 14(28.0%) moderate response, while 10(20.0%) poor response.

Table (2): The response to the treatment.

Response	Frequency	Percentage
Excellent response (75-100%)	7	14.0
Good response (50-75%)	19	38.0
Moderate response (25-50%)	14	28.0
Poor response (0-25%)	10	20.0
<b>Total</b>	<b>50</b>	<b>100.0</b>

Table (3) demonstrates the recorded side effects of the treatment and shows that most of the patients 45 (90.0%) did not report any side effect. The recorded side effects are mild erythema is 2(4.0%), pruritis 1(2.0%), burning pain 1(2.0%), and xerosis 1(2.0%).

study conducted by Mraisl and Saleh.<sup>[22]</sup> observed high percent of the patients were under 20 years 38(31.86%). But was in disagree with Nejad *et al.*,<sup>[23]</sup> who reported that the mean age of vitiligo patients was (28.11) year.

Table (3): The recorded side effects of the treatment.

Recorded side effects	Frequency	Percentage
No side effect	45	90.0
Mild erythema	2	4.0
Pruritis	1	2.0
Burning pain	1	2.0
Xerosis	1	2.0
<b>Total</b>	<b>50</b>	<b>100.0</b>

Concerning the gender, the present study found that out of the 50 participants, 17 are males and 33 are females with female: male ratio was 1.94:1. In the study conducted by Tariq and Hussein<sup>[24]</sup> which involved 60 patients with Vitiligo, the males are 23 and represented (38.33%) of the sample while the females are 37 (61.67%) with a ratio F/M equals to 1.6:1. The study conducted by Kumar *et al.*,<sup>[25]</sup> found that out of the 150 included patients, 69 (46%) were males and 81 (54%) were females.

**DISCUSSION**

Numerous studies have demonstrated that NBUVB therapy is significantly more efficient, better, and safe than PUVA therapy.<sup>[18,19]</sup>

The duration of disease in the present study was ranged from 6 months to 17 years with the mean of 9.4±1.1 years which was corresponding to finding of the Kumar *et al.*, study.<sup>[25]</sup> ranged from 1 month to 28 years, with a mean duration of 14 years. Eighty-two (54.6%) patients had duration of vitiligo of 5 years or less and 68 (45.4%) patients had duration of vitiligo of more than 5 years. Moreover, Vitiligo duration was found to be between 3 and 33 years in that conducted in the University of California San Francisco Department of Dermatology Psoriasis and Skin Treatment Center.<sup>[26]</sup>

The present study showed that the most of males and female are below the age of 20 years representing 70.0% of the sample with a mean age of 19.4± 3.2 years. Similar results were found in Sharquie.<sup>[20]</sup> reported that the mean age of Iraqi vitiligo patients was 17.9 year with the higher distribution of vitiligo patients occurred between (11-20) year age group and agree with Sehgal and Srivastava.<sup>[21]</sup> who mentioned that vitiligo occurs in young people between the age of (10- 20) year. Also the

Concerning the response to NBUVB in the present study, the excellent response was reported in 7(14.0%), while 19(38.0%) and 14(28.0%) showed good and moderate responses respectively. Poor response was noticed in 10(20.0%). According to Chen *et al.*, study,<sup>[27]</sup> nine patients (12.5%) had an excellent response (75.0-100.0% area of re-pigmentation), 24 had a fair response (50.0-75.0%), 20 had a moderate response (25.0-50.0%), and 19 had a bad reaction (0.0-25.0%). Furthermore, the study conducted by Chahar *et al.*,<sup>[28]</sup> which involved 54 patients, found that 12 (22.22%) patients showed <25.0% re-pigmentation, 27 (50 patients showed 25.0%–75.0% re-pigmentation, and 11 (20.34%) patients showed >75.0% re-pigmentation. Only 4 (7.4%) cases showed complete re-pigmentation. The mean cumulative dose of radiation received by the patients was 39.8 J/cm<sup>2</sup>, and the average number of treatment sessions was 45.63±12.74. Additionally, according to Kumar *et al.*,<sup>[25]</sup> research, of the 150 patients, 51 (34.0%) had less than 25.0% re-pigmentation, 73 (48.6%) had 25.0-75.0% re-pigmentation, and 26 (17.4%) had more than 75.0% re-pigmentation. Only five (3.1%) of the 26 instances exhibited complete re-pigmentation. With a mean of 19 treatments, five of the seven patients were able to acquire more than 75.0% re-pigmentation; the average length of the illness was 13 months. After 46 and 48 treatments, the two remaining patients, respectively, had 50.0% and 40.0% of their original pigmentation. Their median illness duration was 132 months.<sup>[29]</sup>

The side effects that the patients in the current study reported were hardly evident, and none of the patients' therapies had to be stopped or altered as a result. Out of the 50 patients, 45 did not experience any side effects; however, two patients experienced minor erythema, one developed pruritis, one experienced burning pain, and one experienced xerosis. The side effects profile seen in this investigation was comparable to those described in the literature.<sup>[29-33]</sup> The safety profile of NBUVB therapy is firmly established by all of these investigations, including the current study. Adverse side effects were low, and none of the patients needed medication interruption. Nine (6.0%) individuals complained of xerosis, and 11 (7.0%) patients reported mild erythema/burning/pruritis. All of these side effects were minor and went away when the radiation dose was reduced or when an emollient was applied topically to the affected area.<sup>[25]</sup> According to Chen *et al.*, study transitory erythema with itching or xerosis was observed in 5 individuals (7.0%), and burning sensations were a side effect in 5 patients (7.0%).<sup>[27]</sup> In the study by Kanwar *et al.*<sup>[32]</sup> three patients (21.4%) and four patients (28.6%) both complained of xerosis with thickening of lesional skin.

Retrospective analysis of Scherschun *et al.*,<sup>[29]</sup> experience using NBUVB given as monotherapy three times per week to cure vitiligo was done. The remaining two patients demonstrated 50.0% and 40.0% re-pigmentation after 46 and 48 sessions, respectively,

whereas five of their seven patients attained more than 75.0% re-pigmentation with a mean of 19 treatments. Njoo *et al.*, recent meta-analysis of nonsurgical treatments for generalized vitiligo found that.<sup>[34]</sup> NBUVB had greater success rates (63.0%) than oral PUVA (51.0%). NBUVB therapy was suggested as the most efficient and secures treatment for widespread vitiligo in an important effort to produce evidence-based guidelines for its management.<sup>[35]</sup> To provide recommendations regarding the safe maximum NBUVB dose, there are currently not enough human data available. However, it has been determined that the long-term risk for carcinogenesis of NBUVB may be lower than that of PUVA therapy based on a dose-response model.<sup>[36]</sup> Due to the lower UVB dose per treatment and the extremely seldom use of immunosuppressive medications, such as cyclosporine, methotrexate, etc., in vitiligo patients, it is thought that the long-term risk of carcinogenesis with NBUVB use is compared to that in those treated for psoriasis. Furthermore, skin-saving practices, such as covering areas that have successfully undergone re-pigmentation and securing the genital region, can lower the incidence of cutaneous malignancies in people with vitiligo.<sup>[37]</sup>

## CONCLUSION

Many patients had re-pigmentation quickly as a result of this therapy regimen. This data supports earlier studies by showing that narrow-band UVB is an effective and well-tolerated treatment for vitiligo.

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