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NARROW BAND ULTRAVIOLET LIGHT FOR TREATMENT OF VITILIGO

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ABSTRACT

Background: Vitiligo is a chronic pigmentary skin condition characterized by the selective loss of melanocytes, resulting in white, hypopigmented macules and patches. It is the primary cause of cutaneous depigmentation, affecting 0.5%-2% of the worldwide population. This study aims to evaluate the safety and efficacy of narrowband ultraviolet B (NB-UVB) treatment among vitiligo patients in Babylon City. **Patients and Methods:** This is a cross sectional study that included 108 patients with vitiligo and was conducted in Babylon, Iraq during the period from 14/2/2023 to 17/9/2024. Patients with stable vitiligo and with >5% involvement of body surface area were included. All participating patients received treatment with biweekly applications to either all or particular vitiligo lesions on non-consecutive days. The total duration of treatment continued from 3 – 18 months. **Results:** Among 223 lesions, 53.4% of patients achieved 90-100% repigmentation, 27.4% had 50-75%, and 19.3% had less than 50%, indicating a favorable treatment response for most patients. Regarding treatment side effects; among 108 patients, 70.4% of patients reported no side effects, while 23.1% experienced non-painful erythema, 4.6% had painful erythema, and 1.9% developed bullous lesions, indicating a predominantly positive safety profile. **Conclusion:** This study demonstrates that NB-UVB treatment is a safe and effective therapeutic option for vitiligo patients in Babylon City, with a majority of patients achieving significant repigmentation and experiencing minimal side effects.

INTRODUCTION

Vitiligo is a chronic pigmentary skin condition characterized by the selective loss of melanocytes, resulting in white, hypopigmented macules and patches. It is the primary cause of cutaneous depigmentation, affecting 0.5%-2% of the worldwide population. Fifty percent of patients present before to the age of 20, however the illness may arise at any point in life. Both men and females are equally affected, regardless of race or skin tone.[1,2] It has a significant psychological impact, especially on those with pigmented skin.[3] Recent advancements have significantly enhanced our comprehension of vitiligo's origin, which is now definitively categorized as an autoimmune disorder.[4] This disorder involves a reduction of melanocytes, leading to the depigmentation of certain areas of the skin. Vitiligo presents as discrete, entirely depigmented, chalky-white patches.[2]

A variety of topical and systemic therapeutic approaches are available. Targeted phototherapy involves using a phototherapeutic device that accurately directs treatment to affected skin via specific delivery mechanisms, while protecting the surrounding skin from exposure. A notable advantage of this phototherapy technique is the protection of unaffected skin, enabling the application of more energy for expedited therapeutic results. The treatment may occur monthly or weekly, with each session lasting just a few seconds. The therapeutic results are enhanced owing to less contrast between lesional and perilesional skin, and the cumulative adverse effects of whole-body irradiation are avoided.[5] Psoralen combined with ultraviolet A (PUVA) was once a prevalent phototherapeutic treatment. However, the negative consequences of psoralen, such as nausea, vomiting, phototoxicity, and the carcinogenic risk linked to PUVA therapy, have resulted in its decreased popularity.[6] The discovery of PUVA enabled developments such as narrow band ultraviolet light (NB-UVB), which proved more effective than broad band ultraviolet light (BB-UVB) and ultimately replaced it. Moreover, NB-UVB has shown advantages in many dermatoses previously treated with PUVA, presenting less side effects. NB-UVB continues to be a principal treatment for psoriasis and vitiligo.[7]

This study aims to evaluate the safety and efficacy of NB-UVB treatment among vitiligo patients in Babylon City.

PATIENTS AND METHODS

Study design and setting

This is a cross sectional study that included 108 patients with vitiligo and was conducted in Babylon, Iraq during the period from 14/2/2023 to 17/9/2024.

Inclusion criteria

1. Patients with stable vitiligo (Characterized as vitiligo exhibiting no further progression or spontaneous repigmentation within a three-month interval).
2. Patients with >5% involvement of body surface area.

Exclusion criteria

1. History of photosensitivity disorders (e.g., lupus erythematosus).
2. History of skin cancer (melanoma or non-melanoma).
3. Pregnancy or breastfeeding.
4. Use of immunosuppressant medications or conditions causing immunosuppression.
5. Patients who received other form of phototherapy.
6. Patients who showed poor compliance with treatment.

Informed agreement was acquired from each participant, followed by a comprehensive dermatological history and examination for each case.

All participating patients received treatment with biweekly applications to either all or particular vitiligo lesions on non-consecutive days. The initial dosage administered to each participant was 250 mJ/cm2, with further increments of 50 mJ/cm2 provided after each session until moderate erythema was achieved. The same dosage was maintained until the patient exhibited little erythema or perifollicular pigmentation. If blistering or severe erythema occurred, therapy was suspended for one week, and the dosage was decreased by 50 mJ/cm2 from the prior administration.. During the study time, no topical nor oral pharmacological therapy were permitted, and patients were monitored weekly for signs of repigmentation, both clinically and by repeated digital photography. Targeted NBUVB was administered for a maximum of 30 sessions or until full repigmentation of the treated lesions, whichever happened first. Patients displaying no evidence of repigmentation after the twelfth treatment dosage were not given further doses and were presented with other treatment alternatives. The total duration of treatment continued from 3 – 18 months.

The extent of repigmentation was categorized as the following: <50%, 50 - 75%, and 90 – 100%. This categorization was based on an inverse scoring of the vitiligo area scoring index. This assessment uses seven percentage levels representing different degrees of depigmentation: "100% (complete depigmentation), 90% (scattered pigment specks), 75% (depigmented area > pigmented area), 50% (equal depigmented and pigmented areas), 25% (pigmented area > depigmented area), 10% (scattered depigmentation), and 0% (complete repigmentation)".[8]

Data entry was done using Microsoft Excel 2019. Analysis was done using statistical package for social sciences (SPSS version 26). Chi square test was used to test the association between the degree of repigmentation and each of age, site of the lesion, and duration of vitiligo. A two-tailed p value of less than or equal to 0.05 was assigned as a criterion for declaring statistical significance.

RESULTS

A total number of 108 patients were included (223 lesions). The age distribution of the studied sample ranged from 4 – 43 years with a mean of 13.49 ± 7.7 SD. Most patients (80.6%) were <18 years. Sex distribution showed a female predominance, as the female to male ratio was 1.25:1. Regarding disease duration, 42.6% had <3 years duration, 26.9% had 3-5 years, and 30.6% had ≥5 years; as shown in Table (1).

Table 1: Basic characteristics of the studied sample.

Basic characteristics	Frequency (N=108)	Percentage
Age		
<18 years	87	80.6
18-40 years	19	17.6
≥40 years	2	1.9
Sex		
Male	48	44.4
Female	60	55.6
Duration of vitiligo		
<3 years	46	42.6
3-5 years	29	26.9
≥5 years	33	30.6

Among 223 lesions Table (2) shows that lesions are most common on the face (68.5%), followed by the trunk (58.3%), lower limbs (43.5%), and upper limbs (36.1%).

Table 2: Distribution of the studied lesions according to lesion site.

Site of lesion	Frequency (N=223)	Percentage
Face and neck	74	68.5
Trunk	63	58.3
Lower limbs	47	43.5
Upper limbs	39	36.1

Among 223 lesions, Table (3) shows that 53.4% of patients achieved 90-100% repigmentation, 27.4% had 50-75%, and 19.3% had less than 50%, indicating a favorable treatment response for most patients.

Table 3: Distribution of lesions according to repigmentation rate after treatment.

Repigmentation rate after treatment	Frequency (N=223)	Percentage
<50%	43	19.3
50-75%	61	27.4
90-100%	119	53.4

Table (4) shows that among 108 patients, 70.4% of patients reported no side effects, while 23.1% experienced non-painful erythema, 4.6% had painful erythema, and 1.9% developed bullous lesions, indicating a predominantly positive safety profile.

Table 4: Distribution of patients according to NB-UVB side effect profile.

Side effects	Frequency (N=108)	Percentage
Non painful erythema	25	23.1
Painful erythema	5	4.6
Bullous lesions	2	1.9
None	76	70.4

Table (5) shows that no significant association was detected between patient's age and repigmentation rate (P=0.387).

Table 5: Association between patient's age and repigmentation rate.

Patient's age	No. of patients	No. of lesions	<50% repigmentation	50-75% regimentation	90-100% repigmentation
<18 years	87	171 (100%)	31	43	97
			18.1%	25.1%	56.7%
18-40 years	19	46 (100%)	11	16	19
			23.9%	34.8%	41.3%
≥40 years	2	6 (100%)	1	2	3
			16.7%	33.3%	50.0%
Total	108	223 (100%)	43	61	119
			19.3%	27.4%	53.4%

Table (6) shows that lesions in the face and neck showed higher repigmentation rate; however, it did not reach statistical significance (P=0.321).

Table 6: Association between site of lesion and repigmentation rate.

Site of lesion	No. of lesions	<50% repigmentation	50-75% regimentation	90-100% repigmentation
Face and neck	74 (100%)	13	17	44
		17.6%	23.0%	59.5%
Trunk	63 (100%)	15	13	35
		23.8%	20.6%	55.6%
Lower limbs	47 (100%)	10	16	21
		21.3%	34.0%	44.7%
Upper limbs	39 (100%)	5	15	19
		12.8%	38.5%	48.7%
Total	223 (100%)	43	61	119

		19.3%	27.4%	53.4%

Table (7) shows that shows that no significant association was detected between duration of vitiligo and repigmentation rate (P=0.631).

Table 7: Association between duration of vitiligo and repigmentation rate.

Duration of vitiligo	No. of patients	No. of lesions	<50% repigmentation	50-75% regimentation	90-100% repigmentation
<3 years	46	103	24	29	50
			23.3%	28.2%	48.5%
3-5 years	29	56	9	16	31
			16.1%	28.6%	55.4%
≥5 years	33	64	10	16	38
			15.6%	25.0%	59.4%
Total	108	223	43	61	119
			19.3%	27.4%	53.4%

DISCUSSION

The present study found a mean age of 13.49 with most patients being <18 years. A study by Vedamurthy et al. found that vitiligo is most prevalent among adolescents and young adults, accounting for 66% of cases, while children under 10 years represented 18% and adults over 50 years made up 20%. The onset of symptoms was frequently observed in the age group of 11-20 years.[9] Another study by Mahajan et al. revealed that the mean age of patients with vitiligo was around 24 years, with a significant percentage of cases starting before the age of 25. Specifically, 71.3% of people had onset before this age.[10]

This study found a female predominance. A study indicated that the female-to-male ratio in vitiligo patients was approximately 2:1, with females being more likely to seek treatment due to social stigma and awareness of cosmetic changes.[11] Another study found that older males were less likely to report vitiligo compared to older females, with males showing a longer duration of the disease (6.9 years) compared to females (4.9 years).[12]

In this study, face and neck were the most common affected sites. A study focusing on childhood vitiligo by Zahra et al. found that the face and neck were the most common sites of onset (43.4%), followed by lower limbs (26.6%) and trunk (13.3%).[13] Ahmed et al. indicated that the lower limbs were the most frequently involved area (62%), followed by the face (46%) and upper limbs (30%).[14] Vora et al. also reported that the initial site of lesions was predominantly the lower limb (41.5%), with subsequent involvement of the scalp (25.2%), face (20.2%), and upper limb (11.7%).[15]

This study found that NB-UVB was an efficient treatment for vitiligo, as 53.4% of patients achieved 90-100% repigmentation. Side effects were minor and well tolerated by patients. The study by Westerhof et al. first documented favorable results with NB-UVB in vitiligo, with 63% of their patients achieving 75% or more repigmentation after 12 months of biweekly therapy, compared to 46% of patients gaining a similar degree of repigmentation with topical PUVA.[16] The study by Majid who reported that 77.5% of patients responded to targeted NB-UVB therapy, achieving 50–100% repigmentation. The best outcomes were observed on the face and neck, with rapid onset of repigmentation as early as the second week.[17] A study involving 20 patients treated with NB-UVB twice weekly for six months reported that 70% of patients achieved more than 75% repigmentation, while 20% achieved 50% repigmentation. The results highlighted excellent color matching at repigmented sites, with minimal adverse effects such as burning and pruritus.[18] Scherschun et al. conducted NB-UVB monotherapy triweekly for vitiligo, with objectives of 75% repigmentation or cessation of further progress. Favorable outcomes were reported in five of seven patients after an average of 19 sessions, with improved clinical results seen in those with a shorter illness duration.[19] A randomized trial conducted by Yones et al. including 25 patients with severe vitiligo showed that 64% of participants undergoing biweekly NB-UVB phototherapy achieved over 50% overall repigmentation. The median number of therapy sessions was 97 and all patients undergoing NB-UVB had an outstanding color match.[20]

CONCLUSION: This study demonstrates that NB-UVB treatment is a safe and effective therapeutic option for vitiligo patients in Babylon City, with a majority of patients achieving significant repigmentation and experiencing minimal side effects.

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