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Evaluation Of The Therapeutic Effect Of PUVA Therapy In Chronic Vitiligo Patients.

P Arun Prasath[1]*, and S Raja[2].

[1]Assistant Professor, Department of Dermatology and Venerology, Nandha Medical College And Hospital, Erode Tamil Nadu, India.
[2]Associate Professor, Department of Dermatology and Venerology, Nandha Medical College And Hospital, Erode Tamil Nadu, India.

ABSTRACT

Vitiligo is an acquired pigmentary disease, characterized by depigmented macules or patches which distract the psychosocial behavior of patients. Various therapeutic modalities have been administered over time with variable outcomes. Psoralen followed by irradiation with UV-A (PUVA) is one of the effective treatment methods for chronic vitiligo cases who had failed to react to the other treatment methods. To assess the efficacy of the therapeutic effect of oral psoralen followed by ultraviolet-A irradiation (PUVA) therapy for chronic vitiligo cases. A total of 36 patients of both sexes with acral, acrofacial, and generalized vitiligo with more than 20% spread over the body, between the age group 15-60 years were recruited. 8 MOP tablets are given on an empty stomach according to body weight. All cases undergone UVA exposure artificial phototherapy chamber starting with a dose of 4 J/m^2 (Dosage depends on Fitzpatrick skin type) over the whole body after 90 min. Clinical response was evaluated as a marked response rate. Generalized vitiligo was seen in 66.6% of cases, acral was seen in 16.6% of cases, and acrofacial was seen in 16.6% of cases. Erythema was the common side effect followed by xerosis, pruritus, nausea and vomiting, bulla, and burning. The mean duration of treatment was 14.52 months with the mean no of sessions being 62.18.PUVA therapy is a well-established treatment modality for vitiligo with very minimal risk of malignancies and has fewer side effects like erythema and xerosis. PUVA is safe, effective, and cosmetically acceptable. Generalized vitiligo responded well to the treatment.
Keywords: Psoralen and ultraviolet A (PUVA), Generalised vitiligo, Acral vitiligo, Acrofacial vitiligo.

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Corresponding author

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INTRODUCTION

Vitiligo is one of the most common ancient diseases known to mankind characterized by depigmented macules and patches [1]. It is caused by selective destruction of cutaneous melanocytes, which affects both sexes and can be developed at any age. Vitiligo has a prevalence of 0.5%-1%, which impairs the quality of life of a sufferer [2]. Vitiligo has multiple treatment modalities including psoralen and ultraviolet A (PUVA) therapy and narrow band ultraviolet B (NB-UVB), topical therapy like topical corticosteroids, topical vitamin D3 analogs, and topical calcineurin inhibitors, and surgical therapies like split-thickness graft and mini grafts, but these are often unsatisfactory. Psoralen followed by irradiation with UV-A (PUVA) is one of the well-established treatments for vitiligo [3]. PUVA causes repigmentation by activating inactive melanocytes in the hair root sheath and the middle and lower part of the hair follicle [4]. For effective results PUVA has to be given for a prolonged duration with at least 100-200 sessions at least A days apart, 2-3 times a week. With the reference to above literature, this study was conducted to evaluate the efficacy of the therapeutic effect of oral psoralen followed by ultraviolet-A irradiation (PUVA) therapy for chronic vitiligo cases.

MATERIALS AND METHODS

The present prospective study was conducted in the Department of Dermatology,Venereology and Leprosy Nandha Medical College and Hospital, Erode Tamil Nadu, India in the year February 2024. A total of 36 patients of both sexes between 15-60 years were recruited.

Inclusion Criteria: Cases with acral, acrofacial, and generalized vitiligo with more than 20% spread over the body were included.

Exclusion Criteria: Cases not willing to participate, with photosensitive skin disorders, renal dysfunction, pregnancy, and lactation were excluded. Informed consent was obtained from all the cases.

All cases were subjected to detailed clinical examination and were examined for the pattern of vitiligo, area skin involved, lesions count, lesions color, and mucosal involvement. A complete haemogram and microbial analysis were conducted for regular parameters. Lesions over the body were evaluated with Rule of Nine. Based on the body weight, 8 MOP tablets are given on a n empty stomach. After 90 minutes cases were allowed to UVA exposure artificial phototherapy chamber starting with a dose of 4 J/m^2 (Dosage depends on Fitzpatrick skin type) over the whole body. The procedure was continued twice a week Started with a standard initial dose of 2 J/cm^2 and was increased to 0.5 J/Sq.cm dose depending on subject response. Clinical response was evaluated as a marked response rate, defined as < 25% as a mild response, 26%- 50 as a moderate response, 51%-75%as a good response, and >75% as a marked response in the lesioned area. The data was tabulated and statistical analysis was done by using SPSS statistical software tool.

RESULTS

A total of 36 cases (20 males and 16 females) with acral, acrofacial, and generalized vitiligo with more than 20% spread over the body were considered. Among the cases, generalized vitiligo was seen in 66.6% o f cases, acral was seen in 16.6% of cases, and acrofacial was seen in 16.6% of cases. No cases of segmental and focal vitiligo in this study (Table 1).

Table 1: Clinical distribution of type of vitiligo

Type of vitiligo	Total number of cases (n=36)			
	Stable	Progressive	Number	Percentage
Generalized vitiligo	8	16	24	66.67%
Acral vitiligo	2	4	6	16.6%
Acro facial vitiligo	3	3	6	16.6%
Segmental	-	-	-	-
Focal	-	-	-	-

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Table 2: Side effects by PUVA (n=36)

Symptoms	Generalized (n=24)		Acral (n=6)		Acrofacial (n=6)	
	Number	Percentage	Number	Percentage	Number	Percentage
Nausea and vomiting	7	19.4%	1	2.7%	2	5.5%
Erythema	13	36.1%	3	8.3%	4	11.1%
Bulla	4	11.1%	-	-	1	2.7%
Xerosis	9	25%	2	5.5%	2	5.5%
Pruritus	10	27.7%	1	2.7%	1	2.7%
Burning	1	2.7%	-	-	1	2.7%
Others	-	-	-	-	-	-

Acute side effects of generalized vitiligo were erythema, pruritus, and xerosis followed by nausea and vomiting, bulla, and burning. In the acral vitiligo group, erythema, xerosis, pruritus, nausea and vomiting. In the acrofacial group, erythema, xerosis, nausea and vomiting, bulla, pruritus, and burning (Table 2).

Figure 1: Relationship between PUVA and physical and chemical injury

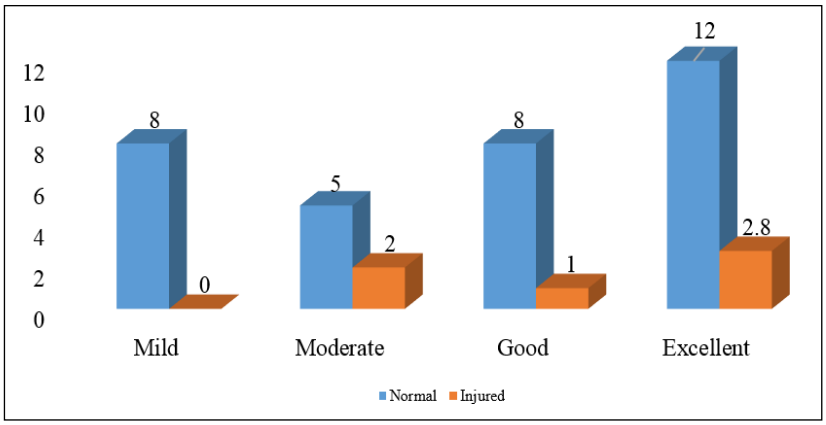

Table 3: Overall response of various types of vitiligo to PUVA therapy

Type	Mild response (<25%)	Moderate response (26-50%)	Good response (51-75%)	Marked response (>75%)	No response
Generalized (n=24)	3	4	11	6	-
Acral (n=6)	-	3	3	-	-
Acrofacial (n=6)	1	2	3	-	-

In generalized vitiligo, excellent response was seen in 6 (25%) cases, good response in 11 (45.8%) cases, moderate response in 4 (16.6%) cases and mild response in 3 (12.5%) cases. In the acral group, a good response was seen in 3 (50%) cases, and a moderate response was seen in 3 (50%) cases. In the acrofacial group, good response was seen in 3 (50%) cases, moderate response was seen in 2 (33.3%) cases, and mild response was seen in 1 (16.6%) case (Table 3). A total of 12 cases had a positive family history of vitiligo. Alopecia areata (30.5%) was the commonest associated autoimmune disorder followed by hyperthyroidism (13.8%) and hypothyroidism (11.1%)(Fig. 2)

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Figure 2: Associated autoimmune disorders in vitiligo

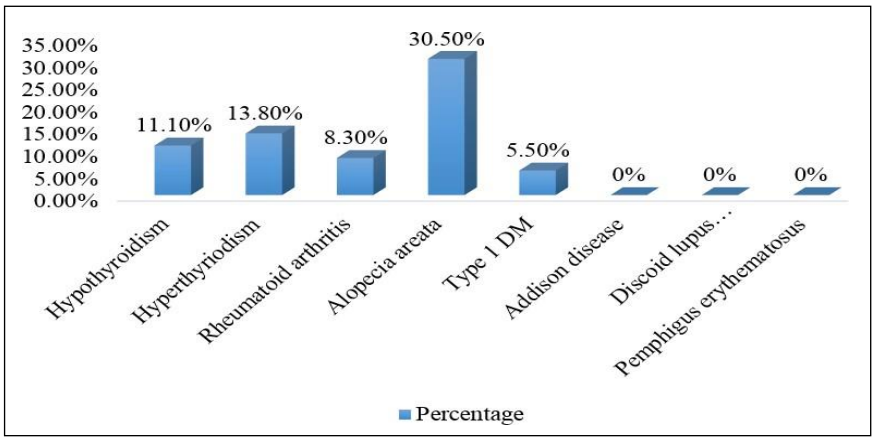

Table 4: Overall response rate of PUVA therapy in vitiligo cases

Clinical demographics of cases	Mean ± SD
Age	37.5 ±10.82
Duration of disease (months)	98.40 ± 38.7
% of the area involved	31.36 ± 8.76
No.of sessions	62.18 ± 32.54
Duration of treatment	14.52 ± 7.98
Cumulative dose (J/cm^2)	230.4 ±126.34
Last visit	21.86 ± 5.72
Regimentation (50-75%)	17 (47.2%)

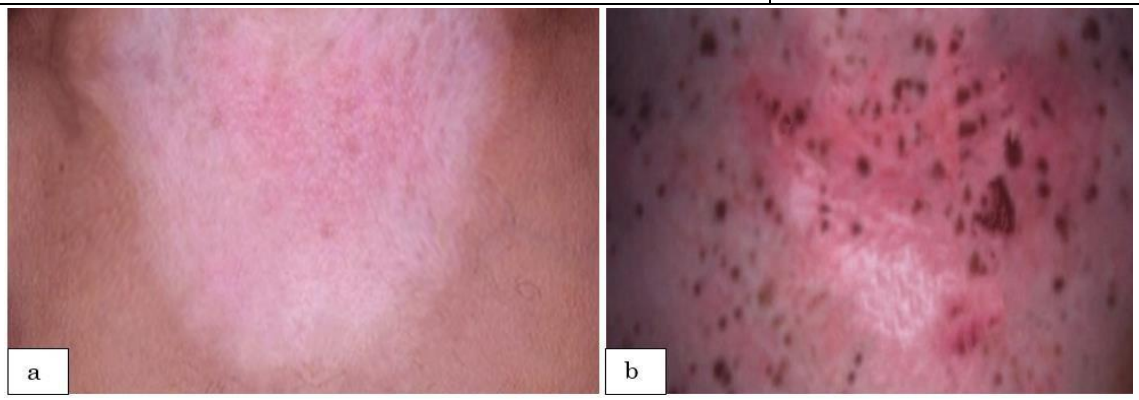

Figure 3: Effect of PUVA therapy before and after treatment; (a): Before treatment), (b): After treatment

DISCUSSION

Psoralens are synthesized naturally or synthetically. 8-methoxy psoralen (8-MOP) is a commonly available oral and topical formulation in India. Psoralen coalesce with epidermal DNA which diminishes DNA replication and thus ceases cell cycle. Psoralens and UV radiation also stimulate melanogenesis. In vitiligo, the mode of pigment induction of PUVA is hypothetical. The photoconjugation of psoralens in melanocyte DNA leads to mitosis, replication, and proliferation of melanocytes, increased number of melanosomes, and their further transfer to keratinocytes. Stimulation of cyclic adenosine monophosphate (cAMP) activity by PUVA leads to increased synthesis of tyrosine. PUVA also affects immunological processes and may induce a suppressor T cell population and release IL-10 which is important for differentiation and activation of T regulatory cells that may suppress the auto-immune stimulus responsible for melanocyte destruction. PUVA also induces basic fibroblast growth factor (bFGF) and hepatocyte growth factor, which may aid in the regrowth and migration of follicular melanocytes to the basal layer of skin.[5,6]Vitiligo is an auto-inflammatory idiopathic skin condition affecting 1% of the

population, with symptoms of depigmented macules and patches [1]. The present study was conducted to evaluate the efficacy of the therapeutic effect of oral psoralen followed by PUVA therapy for vitiligo cases. A total of 36 cases with acral, acrofacial, and generalized vitiligo with more than 20% spread over the body were considered. Among the cases, generalized vitiligo was seen in 66.6% of cases, acral was seen in 16.6% of cases, and acrofacial was seen in 16.6% of cases. No cases of segmental and focal vitiligo in this study (Table 1). The study by Serkan Yazici et al stated generalized vitiligo (16 cases) was a common subtype followed by acrofacial (6 cases) and focal vitiligo (4 cases).[7] Study by Hari Kishan Kumar Y et al, stated that 59.3% of cases had generalized vitiligo, 30% of cases had acral/acrofacial type, 5.3% had focal and 5.3% had segmental type of vitiligo.[8]In the present study erythema was the common side effect followed by xerosis, pruritus, nausea and vomiting, bulla and burning (Table 2). Serkan Yazici et al, in their study not observe any side effects except in one case who had reversible erythema [7]. Hari Kishan Kumar Y et al, in their study stated that 7% of cases reported mild erythema, burning, and pruritus, and 6% of cases complained of xerosis. Due to PUVA therapy, in generalized vitiligo, a marked response was found in 25% of cases, a good response in 45.8% of cases, a moderate response in 16.6% of cases, and a mild response in 12.5% of cases. In the acral group, a good response was seen in 50% of cases, and a moderate response was seen in 50% of cases. In the acrofacial group, a good response was seen in 50% of cases, a moderate response was seen in 33.3% of cases, and a mild response was seen in 16.6% of cases (Table 3).In this study, the mean age of the patients was 37.5 years, the mean duration of disease was 98.40 months and the mean percentage of area affected with vitiligo was 31.36 cm. The mean duration of treatment was 14.52 months with the mean no of sessions being 62.18. In this study, the mean cumulative dose required to get a marked response was 230.4 ± 126.34 J/cm^2 (Table 4). A study by Hari Kishan Kumar Y et al, stated that a lesser number of exposures (51.91) and lesser cumulative dose (46.8 ± 25.2 J/cm^2) was enough to achieve 25-75% repigmentation [8]. A study by Njoo et al, and other Western studies noticed the same repigmentation with a greater number of exposures (76.3 ± 16.7) [9-13]. The results of the present study correlate with the other Indian studies which state that Fitzpatrick type IV and V need a lesser number of exposures than Fitzpatrick type I and II [14-16].

CONCLUSION

PUVA therapy is a safe, effective, and gold- standard therapeutic modality for the treatment of vitiligo with minimal side effects. Which has a very good safety profile in Indian skin and has not been reported other side effects and cases of carcinogenesis. PUVA is better than UVB because of its deep penetration. In this study, the generalized type was better able to respond well to the treatment than acral and acrofacial which are resistant. Erythema was the common side effect followed by xerosis, pruritus, nausea and vomiting, bulla, and burning.

REFERENCES

[1] Dutta AK, Dhar S. Vitiligo: Past and present. Indian J Dermatol 2002;47(3):132-40.
[2] Stephen O. Kovacs, continuing medical education - vitiligo. J Am Acad. Dermatol 1998;38:647-66.
[3] Noor SM, Khurshid K, Mehmood T, Haroon TS. Quality of life in vitiligo patients. J Pak Assoc Dermatol 2004;14:55-8.
[4] Halder RM. Childhood vitiligo. Clin Dermatol 1997;15:899- 906.
[5] Falabella R, Barona MI. Update on skin repigmentation therapies in vitiligo. Pigment Cell Melanoma Res 2008;22:4265.
[6] Wu CS, Lan CC, Wang LF, Chen GS, Wu CS, Yu HS. Effects of psoralen plus ultraviolet A irradiation on cultured epidermal cells in vitro and patients with vitiligo in vivo. Br J Dermatol 2007;156:122- 9.
[7] Kenan Aydogan, Hayriye Saricaoglu, Şukran Tunali. The efficacy of narrowband UVB treatment in pediatric vitiligo: a retrospective analysis of 26 cases. Turk J Med Sci 2017;47:381-384.
[8] Y Hari Kishan Kumar, G Raghu Rama Rao, KVT Gopal, G Shanti, K Veerabhadra Rao. Evaluation of narrow-band UVB phototherapy in 150 patients with vitiligo. Indian J Dermatol Venereol Leprol 2009;75(2):162-166.
[9] Scherschun L, Kim JJ, Lim HW. Narrow-band ultraviolet B is a useful and well-tolerated treatment for vitiligo. J Am Acad Dermatol 2001;44:999-1003.
[10] Yones SS, Palmer RA, Garibaldinos TM, Hawk JLM. Randomized Double-blind trial of Treatment of Vitiligo: Efficacy of psoralen-UVA therapy vs narrowband-UV-B therapy. Arch Dermatol 2007;143:578-83.
[11] Njoo MD, Bos JD, Westerhof W. Treatment of generalized vitiligo in children with narrow-band

(TL-01) UVB radiation therapy. J Am Acad Dermatol 2000;42:245-53.
[12] Anbar TS, Westerhof W, Rahman AT, Khayyat MA. Evaluation of the effects of NB-UVB in both segmental and nonsegmental vitiligo affecting different body sites. Photodermatol Photoimmunol Photomed 2006;22:157.
[13] Gambichler T, Breuckmann F, Boms S, Altmeyer P, Kreuter A. Narrowband UVB phototherapy in skin conditions beyond psoriasis. J Am Acad Dermatol 2005;52:660-70.
[14] Kanwar AJ, Dogra S, Prasad D, Kumar B. Narrow-band UVB for the treatment of vitiligo: An emerging effective and well-tolerated therapy. Int J Dermatol 2005;44:57-60.
[15] Dogra S, Prasad D. Combination of narrow band UVB and topical calcipotriene in vitiligo. Arch Dermatol 2003;139:393.
[16] Kanwar AJ, Dogra S. Narrow-band UVB for the treatment of generalized vitiligo in children. Clin Exp Dermatol 2005;30:332-6.