Original Article
DOI: https://doi.org/10.70749/ijbr.v3i7.2501

INDUS JOURNAL OF BIOSCIENCE RESEARCH
https://ijbr.com.pk
ISSN: 2960-2793/ 2960-2807

Combined Treatment of Psoriasis with Acitretin and UVB Phototherapy Compared with Acitretin Alone

Khalid Aziz[1], Ali Amar[1], Zara Khan[1], Beenish Tariq Janjooha[1], Summer Gul[2]

[1]Department of Medicine, Combined Military Hospital, Abbottabad, KP, Pakistan.
[2]Department of Medicine, Khalifa Gulnawaz Hospital MTI, Bannu, KP, Pakistan.

ARTICLE INFO

Keywords: Acitretin, Phototherapy, Psoriasis, Retinoids, Ultraviolet Rays.

Correspondence to: Summer Gul, Department of Medicine, Khalifa Gulnawaz Hospital MTI, Bannu, KP, Pakistan.
Email: samargul.1090@gmail.com

Declaration
Authors' Contribution
All authors equally contributed to the study and approved the final manuscript

Conflict of Interest: No conflict of interest.

Funding: No funding received by the authors.

Article History
Received: 02-06-2025 Revised: 27-06-2025
Accepted: 08-07-2025 Published: 15-07-2025

ABSTRACT

Background: Psoriasis is a long-lasting skin problem that makes thick, red, and scaly patches on the body. The illness affects physical and emotional life and needs long-term care. Acitretin is an oral medicine that helps to control cell growth, while ultraviolet B light helps to slow the overgrowth of skin cells. Using both together may make the treatment stronger and faster. **Objective:** To compare the efficacy of combined acitretin and UVB phototherapy with acitretin alone in the management of psoriasis. **Study Design:** Randomized controlled trial. **Duration and Place of Study:** This study was done in the Department of Dermatology, CMH Abbottabad, from December 2024 to May 2025. **Methodology:** Sixty-four patients aged 18–60 years having chronic plaque psoriasis were included. Group A received acitretin with UVB phototherapy, while Group B received acitretin alone. Each treatment lasted for twelve weeks. The main outcome was improvement in Psoriasis Area and Severity Index (PASI 75). **Results:** Mean PASI score reduced from 18.45 ± 3.61 to 6.08 ± 3.88 in the combined therapy group and from 17.35 ± 3.70 to 8.54 ± 4.71 in the acitretin alone group. Efficacy was achieved in 71.9% of patients receiving combined therapy and in 31.3% receiving acitretin alone (p = 0.001). **Conclusion:** The combination of acitretin and UVB phototherapy give better and quicker healing than acitretin alone. It is safe and effective for patients having moderate to severe chronic plaque psoriasis..

INTRODUCTION

Psoriasis is a long-lasting inflammatory skin condition that happens due to rapid production of skin cells which build up on the surface and make thick patches that look red, dry, and scaly.[1] It mostly affects the elbows, knees, scalp, and lower back but can appear on any part of the body.[2] The exact cause is not known but the immune system plays an important role where the body's defense system attacks healthy skin cells by mistake causing inflammation and fast cell turnover.[1] Genetic and environmental factors like stress, cold weather, infection, and some medicines make it worse.[2] Patients often feel itching, burning, and pain in affected areas and it can disturb sleep and daily life.[3] Psoriasis is not contagious but it is a chronic disease with phases of flaring and remission.[2] Proper diagnosis and long-term treatment are needed to control symptoms and prevent complications like psoriatic arthritis.[2]

Acitretin is a synthetic vitamin A derivative used for treatment of severe psoriasis especially in plaque and pustular types.[4] It works by normalizing the growth and differentiation of skin cells and also reducing inflammation.[4] It is taken by mouth once daily and shows effect slowly over several weeks. It helps to thin the thick psoriatic plaques and improve scaling and redness.[4] The dose is decided according to severity and patient response.[5] Common side effects include dryness of lips and skin, hair loss, and elevated liver enzymes.[5] Women of childbearing age must avoid pregnancy during and after treatment for a long period because it can cause serious birth defects.[5] Acitretin is often combined with other therapies like phototherapy to improve response and lower the dose requirement.[6]

UVB phototherapy is another effective method used for psoriasis where skin is exposed to ultraviolet B light in a controlled way.[7] The light slows down the rapid skin cell growth and helps in reducing inflammation and scaling.[7] It can be done in hospital or with home phototherapy units under medical guidance. The treatment is given several times per week and improvement is seen gradually after a few weeks.[7] Narrowband UVB is more common because it targets specific wavelengths that work best and cause fewer side effects.[8] Burning, itching, or dryness may occur but are usually mild. UVB therapy can be combined with acitretin which makes the skin more sensitive to light and increases the effectiveness of treatment.[9] This combination reduces total UV exposure and helps to achieve faster clearance and longer remission in psoriasis patients.[9] Lowe NJ, et al. has shown in a study that patients

treated with acitretin 50 mg/day plus UVB phototherapy achieved a 75 % improvement in the Psoriasis Area Severity Index (PASI) and those on acitretin monotherapy achieved only a 42 % improvement.[10]

This study needs to be done in Abbottabad because the number of patients with psoriasis is increasing and many of them not getting full relief with single medicine. The use of acitretin alone sometimes give slow or partial response, so it is important to see if adding UVB phototherapy can make the treatment more effective in local population. In Abbottabad, environmental and genetic factors may also change the response of therapy, so doing this study will help the doctors to understand the best combination for patients here and improve their quality of life.

METHODOLOGY

This randomized controlled trial was done in the Department of Dermatology, CMH Abbottabad, from December 2024 to May 2025. Total 64 patients who were diagnosed clinically with chronic plaque-type psoriasis were included in the study. The sample size was calculated with 95% confidence level and 80% power based on earlier reports showing 75% efficacy for combination of acitretin with UVB phototherapy and 42% for acitretin alone.[10] Both male and female patients from 18 to 60 years with moderate to severe chronic plaque psoriasis covering more than 10% of body surface area were included. Patients who had erythrodermic or pustular psoriasis, photosensitive skin disorders, liver or kidney disease, high cholesterol, pregnant or lactating women, or those who received any systemic or phototherapy in last three months were excluded. Plaque psoriasis was defined as a chronic inflammatory skin disease having well-defined raised red plaques covered with thick silvery-white scales, commonly on elbows, knees, scalp, and trunk. The diagnosis was made clinically by dermatologist through appearance of erythematous scaly plaques showing positive Auspitz sign and presence of Koebner phenomenon. All patients were told about the purpose, advantages, and possible side effects of the study and written consent was taken.

After enrollment, patients were divided randomly into two equal groups of 32 each by sealed opaque envelope method using block randomization. Group A received combination therapy of oral acitretin with narrowband UVB phototherapy. Acitretin was given by mouth in dose of 25 mg daily, adjusted as per clinical response and tolerance. Narrowband UVB phototherapy started one to two weeks after acitretin began, to allow minimal erythema dose (MED) testing at lower back. The first dose of NB-UVB was 50% of MED and treatment was given three times per week, increasing by 10% of MED on each next session depending on redness of skin. The treatment was continued for 12 weeks and UV dose was reduced by half if severe erythema appeared.

Group B received oral acitretin alone in dose of 25 mg daily for same duration. All patients were told to use regular emollients and to avoid other topical or systemic medicines for psoriasis. Follow-up visits were done every two weeks to check side effects and to repeat liver function and lipid tests. Clinical response was checked at start and after 12 weeks using Psoriasis Area and Severity Index (PASI) score. Treatment was called effective if patient had ≥75% improvement (PASI 75) from baseline.

The data has been analyzed and interpreted with the help of IBM SPSS software version 28. The quantitative variables like age and duration of a disease are expressed in mean and standard deviation. The categorical variables like gender and efficacy are expressed in figures and percent. The comparison of both is done through Chi-squared tests. The level of significance is considered as ≤0.05.

RESULTS

In combined therapy group, mean age was 30.75 ± 7.51 years while in acitretin alone group it was 36.44 ± 8.02 years. The disease duration was 15.34 ± 5.49 months in combined therapy group and 16.28 ± 7.07 months in acitretin alone group. Baseline PASI score was 18.45 ± 3.61 in combined therapy group and 17.35 ± 3.70 in acitretin alone group. After 12 weeks of treatment, PASI score reduced to 6.08 ± 3.88 in combined therapy group and 8.54 ± 4.71 in acitretin alone group. Gender distribution showed male predominance in both groups, with 20 males (62.5%) and 12 females (37.5%) in combined therapy group, while acitretin alone group had 21 males (65.6%) and 11 females (34.4%) (as shown in Table-I).

Table I

Patient Demographics in both groups

Variables	Combined therapy (Acitretin + UVB)	Acitretin alone
	n=32 Mean ± SD	n=32 Mean ± SD
Age (years)	30.75 ± 7.51	36.44 ± 8.02
Disease Duration (months)	15.34 ± 5.49	16.28 ± 7.07
PASI baseline	18.45 ± 3.61	17.35 ± 3.70
PASI after 12 weeks	6.08 ± 3.88	8.54 ± 4.71
Gender	**n (%)**	**n (%)**
Male	20 (62.5%)	21 (65.6%)
Female	12 (37.5%)	11 (34.4%)

When comparing efficacy between two groups, combined therapy (Group A) showed significantly better results than acitretin alone (Group B). In Group A, 23 patients (71.9%) achieved efficacy while 9 patients (28.1%) did not achieved efficacy. In Group B 31.3% achieved efficacy whereas 68.8% did not achieved efficacy(as shown in Table-II).

Table II

Comparison of efficacy between the two groups (n=64)

Efficacy	Group A (Acitretin + UVB)	Group B (Acitretin alone)	P value
	n=32 n (%)	n=32 n (%)	
Yes	23 (71.9%)	10 (31.3%)	0.001
No	9 (28.1%)	22 (68.8%)	
Total	32 (100%)	32 (100%)	

Efficacy and demographic variables correlation brought out key observations. In age group categorization, for patients ≤40 years old, efficacy for group A was observed in 20 patients (71.4%) and without efficacy in 8 patients (28.6%), while for group B, efficacy emerged in 6 patients (25.0%) and without efficacy in 18 patients (75.0%), with

a p-value of 0.001. In patients above 40 years old, efficacy for group A developed in 3 patients (75.0%) with no efficacy in 1 patient (25.0%), while for group B, efficacy appeared in 4 patients (50.0%) and without efficacy in 4 patients (50.0%), with a p-value of 0.592 for Fisher Exact Test. In_gender categorization, for males, efficacy in group A emerged in 14 patients (70.0%) and without efficacy in 6 patients (30.0%), while for group B, efficacy in 7 patients (33.3%) and without efficacy in 14 patients (66.7%), with a p-value of 0.023. In females, efficacy in group A appeared in 9 patients (75.0%) and without efficacy in 3 patients (25.0%), while for group B, efficacy in 3 patients (27.3%) and without efficacy in 8 patients (72.7%), with a p-value of 0.019 for Fisher Exact Test. Regarding disease duration, for patients with duration ≤12 months, Group A showed efficacy in 5 patients (50.0%) and no efficacy in 5 patients (50.0%), while Group B achieved efficacy in 2 patients (18.2%) with no efficacy in 9 patients (81.8%), yielding p-value of 0.206 using Fisher's Exact Test. For patients with duration >12 months, Group A demonstrated efficacy in 18 patients (81.8%) with no efficacy in 4 patients (18.2%), whereas Group B showed efficacy in 8 patients (38.1%) and no efficacy in 13 patients (61.9%), with p-value of 0.003 using Fisher's Exact Test (as shown in Table-III).

Table III

Association of Efficacy with Demographic Variables

Demographics variables		Group	Efficacy		P-value
			Yes (n, %)	No (n, %)	
Age (years)	≤40	A	20 (71.4%)	8 (28.6%)	0.001
		B	6 (25.0%)	18 (75.0%)	
	>40	A	3 (75.0%)	1 (25.0%)	0.592*
		B	4 (50.0%)	4 (50.0%)	
Gender	Male	A	14 (70.0%)	6 (30.0%)	0.023
		B	7 (33.3%)	14 (66.7%)	
	Female	A	9 (75.0%)	3 (25.0%)	0.019*
		B	3 (27.3%)	8 (72.7%)	
Duration (months)	≤12	A	5 (50.0%)	5 (50.0%)	0.206*
		B	2 (18.2%)	9 (81.8%)	
	>12	A	18 (81.8%)	4 (18.2%)	0.003*
		B	8 (38.1%)	13 (61.9%)	

*Fisher's Exact Test

DISCUSSION

In this study, mean baseline PASI score in combination group was 18.45 ± 3.61 which decreased to 6.08 ± 3.88 after 12 weeks, while in acitretin alone group PASI score reduced from 17.35 ± 3.70 to 8.54 ± 4.71. The mean reduction was greater in the combined group showing that both drugs act together to improve clearance faster. This higher improvement may be because acitretin makes the skin thinner and more sensitive to UVB light, which allows ultraviolet rays to act more deeply on psoriatic plaques.

The efficacy was achieved in 23 patients (71.9%) of the combined therapy group compared to 10 patients (31.3%) in acitretin alone group. The higher response rate in the combined group may be due to the additive effect of systemic retinoid with phototherapy, where acitretin helps normalize keratinocyte growth while UVB reduces inflammation and suppresses abnormal T-cell activity.

Mean age of combined group was 30.75 ± 7.51 years and acitretin alone group was 36.44 ± 8.02 years, showing that younger patients responded more as their disease duration was shorter and skin repair capacity better. Disease duration also affected outcome; patients with duration more than 12 months responded more in combined group as continuous UV exposure and retinoid both helped in removing chronic thick plaques. Gender analysis showed males were slightly more and had better efficacy probably due to thicker skin and more outdoor light exposure aiding UVB absorption.

The findings of present study demonstrated that combined acitretin and UVB phototherapy was significantly more effective than acitretin monotherapy, with efficacy rates of 71.9% versus 31.3% (p=0.001). These results are consistent with multiple previous investigations. Qadeer F, et al.[11] reported similar superiority of combination therapy, achieving PASI-50 in 92% of patients receiving acitretin plus NBUVB compared to only 38% with NBUVB alone (p≤0.001) after eight weeks treatment. Similarly, Saeed U, et al.[12] found efficacy rate of 82.5% in combination group versus 55% in UVB monotherapy (p=0.015), which supports our findings that adding acitretin enhances therapeutic outcomes. The demographic analysis in our study showed significant efficacy differences in patients aged ≤40 years (71.4% vs 25.0%, p=0.001), males (70.0% vs 33.3%, p=0.023), and those with disease duration >12 months (81.8% vs 38.1%, p=0.003). These patterns was partially supported by Qadeer F, et al.[11] who reported higher efficacy in patients aged 35-50 years (100% vs 48.3%, p<0.001) and males (100% vs 38.1%, p<0.001), and in those with disease duration <2 years (97.1% vs 36.4%, p<0.001). However, Saeed U, et al.[12] found male predominance in efficacy (88% vs 60.87%, p=0.04) but no significant weight stratification effect, which differs from age-based stratification findings.

The mean PASI reduction in our study from baseline 18.45±3.61 to 6.08±3.88 after 12 weeks in combination group demonstrates substantial improvement, though less dramatic than reported by Qadeer F, et al.[11] where PASI decreased from 42.14±13.18 to 14.84±8.86 at eight weeks. This difference may be attributed to higher baseline PASI scores and shorter treatment duration in their study. Agrawal S, et al.[13] demonstrated a PASI-75 response of 73.3% in patients treated with retinoid-fixed NBUVB. This is somewhat similar to our efficacy rate of 71.9%, and this variation may not affect its efficacy for different patient populations. Caliskan E, et al.[14] observed a PASI-75 response of 62% in patients treated with a combination of retinoids and NBUVB. However, this is still more effective when compared to a mono-therapeutic regimen. The rationale for greater efficacy in mechanism-based targeted therapy has been adequately supported. The role of Mortazavi H, et al.[15] and Pastuszka M, et al.[16], for

example, highlighted that reduction in keratinocyte proliferation and suppression of dermal CRABP-2 can work synergistically in potentiating phototherapeutic efficacy. The suppression of IL-17 has been biologically proved in Ye T, et al.'s study[17], hence potentiating its superiority. The role of dose-sparing in combination therapy has been underscored in a number of reports[11-14] since this facilitates a reduced total cumulative dose of UV rays and its subsequent hazards like photo-aging and photocarcinogenesis.

Lack of statistical significance in our study regarding patients above 40 years (75.0% vs 50.0%, p=0.592) and duration of disease ≤ 12 months (50.0% vs 18.2%, p=0.206) has not been observed in similar studies and can be due to lower sample size in those categories. The efficacy based on genders in our study is similar to Qadeer F et al.[11], and Saeed U et al.[12] in males and females respectively but Saeed U et al. have obtained non-significant difference in females. Such discrepancies can occur due to difference in population characteristics and modalities of treatment.

This study has some limitations that should be kept in mind. It was a single center study with limited sample size, so the results may not represent the whole population. The duration of follow up was short and long term relapse or side effects could not be assessed properly. The study did not include biochemical markers or histological confirmation which might give more objective evidence. Also, the randomization was simple and not blinded, so observer bias cannot be ruled out fully. Despite these limitations, the findings still provide useful clinical information about the better efficacy of combined acitretin and UVB therapy in chronic plaque psoriasis.

CONCLUSION

Our study has shown that the combination of acitretin and UVB phototherapy work better than acitretin alone for patients with psoriasis. The patients who got both treatments show more fast healing and better clearing of skin patches. Both treatments were safe but the combination give more strong effect with less UV dose. It can be used as good choice for moderate to severe psoriasis when doctor want quicker and stable control of disease.

Acknowledgments

We provide our deepest gratitude to all staff of dermatology department for their consistent effort and careful handling of patient information, whose support made this research possible.

REFERENCES

1. Dhabale, A., & Nagpure, S. (2022). Types of psoriasis and their effects on the immune system. *Cureus*. https://doi.org/10.7759/cureus.29536
2. Raharja, A., Mahil, S. K., & Barker, J. N. (2021). Psoriasis: A brief overview. *Clinical Medicine*, *21*(3), 170-173. https://doi.org/10.7861/clinmed.2021-0257
3. Snyder, A. M., Taliercio, V. L., Webber, L. B., Brandenberger, A. U., Rich, B. E., Beshay, A. P., Biber, J. E., Hess, R., Rhoads, J. L., & Secrest, A. M. (2021). The role of pain in the lives of patients with psoriasis: A qualitative study on an inadequately addressed symptom. *Journal of Psoriasis and Psoriatic Arthritis*, *7*(1), 29-34. https://doi.org/10.1177/24755303211066928
4. Miao, M., Yan, J., Sun, Y., Liu, J., & Guo, S. (2025). Psoriasis: Unraveling disease mechanisms and advancing pharmacological and Nanotechnological treatments. *Journal of Inflammation Research*, *18*, 2045-2072. https://doi.org/10.2147/jir.s506103
5. Yu, C., Wu, C., Yang, Y., & Jin, H. (2023). Systemic monotherapy with acitretin for erythrodermic psoriasis: Results of a retrospective study of 81 patients. *Therapeutic Advances in Chronic Disease*, *14*. https://doi.org/10.1177/20406223231178412
6. Diotallevi, F., Paolinelli, M., Radi, G., & Offidani, A. (2022). Latest combination therapies in psoriasis: Narrative review of the literature. *Dermatologic Therapy*, *35*(10). https://doi.org/10.1111/dth.15759
7. Hauptman, M., El Othmani, A., Pazhyanur, S., & Nakamura, M. (2025). Narrowband-ultraviolet B phototherapy for psoriasis treatment in skin of color: A systematic review and meta-analysis. *Photodermatology, Photoimmunology & Photomedicine*, *41*(5). https://doi.org/10.1111/phpp.70051
8. Halupczok, A. M., Bohne, A., Gerdes, S., Weidinger, S., & Weichenthal, M. (2024). Tolerability of narrow-band Ultraviolet-B phototherapy for different dermatological diseases in relation to Co-medications. *Acta Dermato-Venereologica*, *104*, adv35215. https://doi.org/10.2340/actadv.v104.35215
9. Li, Y., Cao, Z., Guo, J., Li, Q., Zhu, W., Kuang, Y., & Chen, X. (2022). Assessment of efficacy and safety of UV-based therapy for psoriasis: A network meta-analysis of randomized controlled trials. *Annals of Medicine*, *54*(1), 159-169. https://doi.org/10.1080/07853890.2021.2022187
10. Lowe, N. J., Prystowsky, J. H., Bourget, T., Edelstein, J., Nychay, S., & Armstrong, R. (1991). Acitretin plus UVB therapy for psoriasis. *Journal of the American Academy of Dermatology*, *24*(4), 591-594. https://doi.org/10.1016/0190-9622(91)70089-k
11. Qadeer, F., Tariq, H., & Aman, S. (2022). Comparison of efficacy of combination of Acitretin and narrow band ultraviolet B versus narrow band ultraviolet B alone in the treatment of chronic plaque psoriasis. *Esculapio*, *18*(1), 6-10. https://doi.org/10.51273/esc22.251811
12. Saeed, U., Khan, R. S. U., Zou, X. H., Tang, J. T., & Li, Y. Y. (2016). Efficacy of Combination of UVB and Acitretin Versus UVB Alone in Treatment Of Moderate To Severe Plaque Psoriasis. *PJMHS*, *10*(4), 1252-5.
13. Agrawal, S. Assessment of the efficacy of NB-UVB, Goeckerman therapy, and the effect of the addition of retinoids to the treatment regimen in the treatment of psoriasis. Int J Life Sci Biotechnol Pharma Res. 2022;11(2):75-77. http://ijlbpr.com/uploadfiles/19vol11issue2pp75-77.20240131093339.pdf
14. Çaliskan, E., Tunca, M., Açikgöz,, G., Arca, E., Yürekli, A., & Akar, A. (2015). Narrow band ultraviolet-B versus Goeckerman therapy for psoriasis with and without

acitretin: A retrospective study. *Indian Journal of Dermatology, Venereology, and Leprology*, *81*(6), 584. https://doi.org/10.4103/0378-6323.168329

15. Hossein, M., Nessa, A., Maryam, G., & Vahideh, L. (2013). A review of three systemic retinoids in dermatology: acitretin, isotretinoin and bexarotene. *Iranian Journal of Dermatology*, *16*(4), 144-158. https://www.iranjd.ir/article_98205.html
16. Pastuszka, M., & Kaszuba, A. (2012). Acitretin in psoriasis treatment–recommended treatment regimens. *Advances in Dermatology and Allergology/Postępy Dermatologii i Alergologii*, *29*(2), 94-103. https://www.termedia.pl/Review-paper-Acitretin-in-psoriasis-treatment-recommended-treatment-regimens,7,18509,0,1.html
17. Ye, T., Ye, J., & Zhang, C. (2020). The effects of acitretin on patients with psoriasis vulgaris. *International Journal of Clinical and Experimental Medicine*, *13*(7), 5068-75. https://e-century.us/files/ijcem/13/7/ijcem0105988.pdf