

Efficacy of Narrow-band Ultraviolet b (nbuvb) Combined with oral Acyclovir Versus oral Acyclovir alone in Preventing Postherpetic Neuralgia in Patients with Herpes zoster.

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ABSTRACT

Objective: To compare the effectiveness of oral Acyclovir with narrow-band UVB (nbUVB) in preventing postherpetic neuralgia in herpes zoster patients compared to oral Acyclovir alone

Study Design: Randomized Controlled Trial (IRCT20221215056829N1)

Place and Duration: of Study: was conducted in the Department of Dermatology, Pak-Emirates Military Hospital, Rawalpindi, Pakistan, from Nov 2020 to May 2021.

Methodology: The cases were randomly assigned into two groups. The Ultraviolet Group received narrow-band ultraviolet B radiation 3 sessions per week along with standard antiviral and pain therapy. The Non-Ultraviolet Group just received the routine antiviral and pain therapy. The Verbal Rating Score was noted at the start before initiation of treatment, at the end of therapy, and at 3 months follow up. The mean Verbal Rating Score and percentage of satisfactory results were compared in the two groups.

Results: A total of 100 patients were enrolled in the study, in which 50 patients were randomly placed in the UV-Group and the other 50 in the Non-UV Group. Both groups were matched for age, gender, and mean VRS at the start of treatment. 80% of patients in the UV-Group had bearable or no pain at the end of therapy as compared to 50% in the Non-UV-Group (p-value 0.002). At three months follow up 88% of UV-Group patients had little or no pain as compared to the Non-UV Group, in which 68% had bearable pain (p-value 0.02).

Conclusions: Narrow-band ultraviolet therapy is a better approach that helps prevent painful sequelae in the short and long term.

Keywords: Herpes Zoster, Narrow Band Ultraviolet Therapy, Post Herpetic Neuralgia

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INTRODUCTION

Herpes zoster (HZ), popularly known as shingles, is caused by the varicella-zoster virus becoming active again after being latent in the spinal and cranial sensory ganglia after a clinical or subclinical case of varicella (chickenpox), typically in infancy.¹ Reactivation can happen at any age, although it is more common in the elderly and is considered to be connected to a deterioration in cell-mediated immunity with ageing.² Herpes zoster occurs in between 1.2 and 3.4 out of every 1,000 healthy people worldwide each year.³ Numerous symptoms of HZ include a vesicular rash and discomfort, cranial nerve palsies, zoster paresis, meningoencephalitis, cerebellitis, myelopathy, numerous ophthalmic problems, vasculopathy, and post-herpetic neuralgia (PHN), the latter of which may be the most concerning

long-term effect.⁴ PHN can affect the day-to-day functioning and quality of life of the patients adversely.⁴ Hospitalization due to HZ and PHN is common in elderly people and results in a high expense to healthcare providers.⁵ Younger patients, in whom the disease is often milder, respond reasonably to the current care of HZ with antiviral medications and analgesics, and it is effective against acute pain and skin rash.^{6,7} But PHN, which strikes older people more frequently and more severely, is significantly resistant to treatment.⁸ Management is difficult and sometimes unsatisfying.⁹ Narrow-band Ultraviolet Light B (nbUVB) is one of the treatment options that, if started early in the treatment, has shown promising results in the prevention of PHN in different studies.¹⁰

In Pakistan, limited studies have been done to support the effective role of nbUVB in the prevention of PHN. Therefore, it seemed worthwhile to conduct this study, so as to relieve patients' pain. The primary objective of the study was to compare the efficacy of

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nbUVB in combination with oral Acyclovir versus oral Acyclovir alone in the prevention of post-herpetic neuralgia in patients with herpes zoster.

METHODOLOGY

This was a Randomized Controlled Trial conducted in the Department of Dermatology, Pak Emirates Military Hospital, Rawalpindi, Pakistan, from Nov 20 to May 21. This trial was registered at www.irct.ir (IRCT20221215056829N1). Sample size was calculated using the WHO sample size calculator, keeping the level of confidence at 5%, power of the test 80%, using expected pain relief with nbUVB in a 92.3% proportion and pain relief without administration of nbUVB in a 7.7% proportion; the sample size is calculated to be 100, making 50 in each group.¹¹ Non-probability consecutive sampling was used.

Inclusion Criteria: Patients of either gender, with an age range from 20 – 60 years, presenting with Herpes Zoster, reporting within 07 days of eruption of vesicles, were included in the study.

Exclusion Criteria: Pregnant females, claustrophobic patients, patients having a history of photosensitivity, or who were unable to stand due to any musculoskeletal abnormalities, and patients reporting after 07 days of onset of rash were excluded from the study. Moreover, patients who had logistic issues and were unable to reach for completion of nbUVB sessions were also excluded from the study.

After taking approval from the Ethical Review Committee and the research department of the hospital with IERB no. A/28/EC/205/2020, 100 patients with informed consent, fulfilling the inclusion criteria from the Department of Dermatology, were included in the study. Randomization was conducted through sequentially numbered opaque envelopes generated from a random numbers table into two groups of 50 patients each. 50 sample size was for the Oral Acyclovir Alone group (Control Group / Non-UV Group), while 50 sample size was for the Oral Acyclovir plus nbUVB group (Study Group / UV Group) as well. Both groups were given analgesic Paracetamol for pain relief, with the addition of Gabapentin if required (depending upon severity of pain).

In group A, 50 patients received oral Acyclovir 800mg five times daily for 07 days along with analgesic Paracetamol ± Gabapentin. In group B, 50 patients had nbUVB administered exclusively to the afflicted dermatome while the rest of their bodies were

covered in clothes, coupled with oral Acyclovir 800mg five times daily for seven days together with analgesic Paracetamol and Gabapentin. Starting at 0.21 J/cm², the nbUVB dosage was raised every session by 10% as long as the patient did not experience any negative side effects, such as persistent erythema, burning, or itching. The sessions were repeated 03 times per week to a maximum of 15 sessions or less if the pain settled completely. (Figure-1)

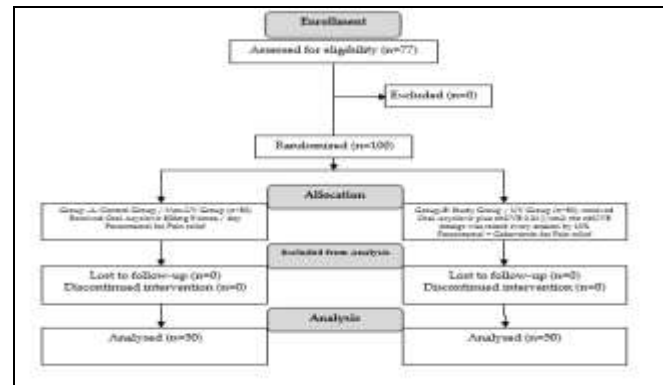


Figure-1: Patient Flow Diagram

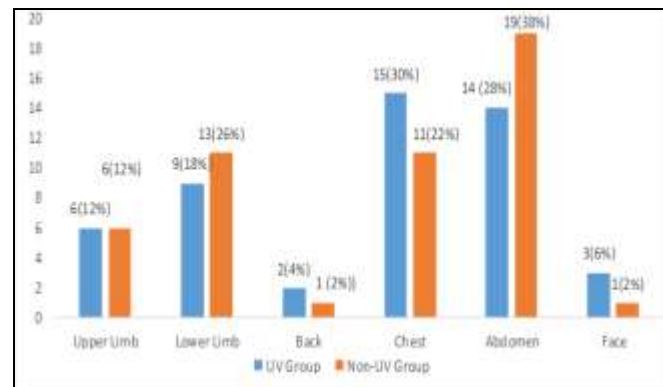


Figure-2: Involvement of dermatome in both groups (n=100)

All the patients were evaluated subjectively for pain relief using Verbal Rating Score (VRS) at the end of treatment sessions and after 03 months follow-up period. Efficacy was noted by the researcher on a specially designed proforma. Pain severity was assessed by using a 4-point Verbal Rating Scale (VRS) as reported by the patient.

Mean ±SD was presented for quantitative variables like age, duration of complaint, and pain improvement as per VRS. Frequency and percentage were computed for qualitative variables like age groups, gender, and efficacy. Chi-square test was used to examine efficacy between the two groups, with a *p*-value of ≤ 0.05 considered significant. To determine

how these factors affected effectiveness, stratification was done based on age, gender, illness duration, and VRS score. Using the chi-square test after stratification, $p \leq 0.05$ was regarded as statistically significant for both groups.

RESULTS

There were a total of 60 male patients (60%) and 40 female patients (40%) in both groups. There is no statistical difference in terms of gender in both groups. The mean age of all patients was 48.07 ± 11.99 years at the time of admission. The minimum age in both groups was 22 years, and the maximum age in both groups was 70 years. There was no significant difference between the means of the two groups as depicted by student t test (p -value = 0.747). The mean duration of illness at admission in all patients was 3.60 ± 1.310 days. The various demographic features of the two groups are shown in Table-I. The involvement of dermatomes in both groups is shown in figure-2. The most common area involved was the abdomen, present in 32 (32%) patients. There was no statistical difference between the two groups in terms of dermatome involvement (p -value=0.672)

Table-I: Demographic variables of two groups (n=100)

Gender	Males n = 60	Females n = 40	p-value
UV Group	33 (66.6%)	17(33.4%)	0.307
Non-UV Group	27(54%)	23(46%)	
Age (Years)	Mean±SD		0.747
UV Group	48.46±11.867		
Non-UV Group	47.68±12.237		
Onset of symptoms (Days)	Mean±SD		0.649
UV Group	3.66±1.349		
Non-UV Group	3.54±1.281		

*UV- Ultraviolet

The median VRS score in both groups before initiation of therapy was 3.00 with an interquartile range of 1. The minimum value was 1, and the maximum was 4. VRS was re-divided into two groups. People having a score between 0-2 were assigned as bearable pain, and patients having a pain score of 3 and 4 were grouped as unbearable pain. The VRS at diagnosis, after treatment, and at 3-month follow-up in both groups is shown in Table-II.

DISCUSSION

This study has proved a clear benefit of nbUVB along with Acyclovir in preventing Postherpetic Neuralgia (PHN). The male gender was more involved

in our study, which amounts to 60% of our cases. Various studies also indicate that there is male preponderance in contracting Herpes Zoster. A study by Kawai *et al.*, showed that ultraviolet radiation exposure through the sun increases overall incidence and severity of herpes in men.¹ The mean age of patients in our study was 48.07 ± 11.99 years. This is lower than the mean age noted in a study by Mawakingwe *et al.*¹² The reason for the lower age in our study could be the relatively younger population in our patients, who are the main dependent clientele of the military hospital.

Table II: VRS at diagnosis, at end of treatment and at 3 months follow-up in both groups (n=100)

VRS at diagnosis					
VRS at diagnosis	UV Group n = 50	Non-UV Group n = 50	p-Value	Odds Ratio	CI 95%
Bearable	9(18%)	8(16%)	0.790	1.152	0.405-3.277
Un-bearable	41(82%)	42(84%)			
VRS at end of treatment					
Bearable	40(80%)	25(50%)	0.002	4.000	1.647-9.715
Un-bearable	10(20%)	25(50%)			
VRS at 3 months follow up					
Bearable	44(88%)	34(68%)	0.020	3.451	1.220-9.759
Un-bearable	6(12%)	16(32%)			

*VRS - Verbal Rating Score

The main dermatomes that were involved were in the chest and abdomen. This is also consistent with various published studies similar to Mbinta *et al.*¹³ The median VRS of patients at the time of presentation was 3, with an interquartile range of 1, and the total number of patients having unbearable pain was 87%. After initiation of therapy, the patients in the UV group underwent a mean total of 12.36 ± 3.009 sessions. This is higher than in the study done by Ding *et al.*, which had a total mean of 7 sessions per patient.¹⁴ The higher number can be explained by the institutional protocol for continuation of therapy until complete pain relief. There was a significant improvement in VRS at the end of treatment in the UV-Group, in which 80% of patients had no or bearable pain, whereas in the Non-UV-Group only 50% of patients had experienced improvement in pain. This was significant (p -value 0.002, OR 4.0, 95% CI 1.647-9.715). Similarly, at three-month follow-up, 88% of patients in the UV-Group had satisfactory recovery, whereas in the Non-UV-Group it was 68%. One patient in the UV-Group still had VRS of 4, whereas four patients in the Non-UV-Group had VRS of 4 at 3-month follow-up. This was also significant (p -value 0.02, OR 3.451, CI 95% 1.220-9.759). In a study Ngo *et al.*, it is shown that patients who received nbUVB during treatment along with Acyclovir had 92.3%

complete pain relief as compared to 7.7% in the group that did not receive nbUVB.¹⁵ Similarly, a study by Chen *et al.*, showed that after 3 months of follow-up of patients who received nbUVB in their treatment, 23% had complete cure, and 47% had >50% improvement in their pain.¹⁶ Jalali *et al.*, described the evolution of 12 patients older than 40 years, with PHN treated with nbUVB phototherapy; 58.33% and 83.33% of patients were completely pain-free at one and three months follow-up, respectively.⁵

UVB alters the course of PHN by decreasing inflammation and switching the Th-1 cytokine profile to the Th-2 cytokine profile, which is crucial to the pathophysiology of the disease.¹⁷ The Langerhans cells, which sensitize nociceptors and influence immune response by releasing a variety of cytokines, are one of the likely targets. In response to UVB stimulation, keratinocytes and mast cells release immunosuppressive cytokines that prevent Langerhans cells from presenting antigen and lead to their depletion in the epidermis.¹⁸

No patients in our study experienced any adverse effects from nbUVB therapy, and various studies similar to Pan *et al.*, have also proven its safety.¹⁹ Rarely, negligible side effects have been recorded, which were resolved with minor therapies.

LIMITATION OF STUDY

There are a few limitations of the study. The sample size was small, and the study population was very specific, so the results cannot be generalized because of this selection bias. Moreover, the additional risk factors such as sunlight exposure, financial burden of nbUVB due to its non-availability at all dermatology setups, and co-morbidities were not assessed. The author recommends a multi-centric randomized controlled trial representing the general population to confirm the findings of the study.

CONCLUSION

Post-herpetic neuralgia is one of the most dreadful sequelae of herpes zoster, which can have marked effects on quality of life. nbUVB therapy is very effective in preventing PHN at the end of treatment and at 3 months follow-up, hence improving the overall quality of life for patients.

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Conflict of Interest: None.

Discolure:

Authors' Contribution

Following authors have made substantial contributions to the manuscript as under:

AAK & NI: Data acquisition, data analysis, critical review, approval of the final version to be published.

IA & RMTS: Study design, data interpretation, drafting the manuscript, critical review, approval of the final version to be published.

SN & MA: Conception, data acquisition, drafting the manuscript, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

REFERENCES

1. Kawai K, VoPham T, Drucker A, Curhan SG, Curhan GC. Ultraviolet radiation exposure and the risk of herpes zoster in three prospective cohort studies. *Mayo Clin Proc* 2020; 95(2): 283-292.
<https://doi.org/10.1016/j.mayocp.2019.10.026>
2. Faysal LR. Efficacy of narrow band UVB in combination with oral acyclovir versus oral acyclovir alone in prevention of post-herpetic neuralgia in patients with herpes zoster. *J Pak Assoc Dermatol* 2019; 29(1): 40-44.
3. Sachdeva R, Nanduri VS. Management of post-herpetic neuralgia (PHN) by Yoga Prana Vidya (YPV) healing: a case study. *Am J Biomed Life Sci* 2019; 7(6): 174-178.
<https://doi.org/10.11648/j.ajbls.20190706.19>
4. El Nabarawy E. The use of narrow-band ultraviolet light B in the prevention and treatment of postherpetic neuralgia (a pilot study). *Indian J Dermatol* 2011; 56(1): 44-47.
<https://doi.org/10.4103/0019-5154.77553>
5. Jalali MHA, Ansarin H, Soltani-Arabshahi R. Broad-band ultraviolet B phototherapy in zoster patients may reduce the incidence and severity of postherpetic neuralgia. *Photodermatol Photoimmunol Photomed* 2006; 22(4): 232-233.
<https://doi.org/10.1111/j.1600-0781.2006.00236.x>
6. Zhang M, Wu N, Yang L, Zhang J, Sun X, Liu Y, et al. Study on the T-helper cell 1/2 cytokine profile in blister fluid of patients with herpes zoster and its clinical significance. *J Dermatol* 2011; 38(12): 1158-1162.
<https://doi.org/10.1111/j.1346-8138.2011.01254.x>
7. Koshy E, Mengting L, Kumar H, Jianbo W. Epidemiology, treatment and prevention of herpes zoster: A comprehensive review. *Indian J Dermatol Venereol Leprol* 2018; 84: 251-262.
https://doi.org/10.4103/ijdv.IJDVL_1021_16
8. Kim J, Kim MK, Choi GJ, Shin HY, Kim BG, Kang H. Pharmacological and non-pharmacological strategies for preventing postherpetic neuralgia: a systematic review and network meta-analysis. *Korean J Pain* 2021; 34(4): 509-533.
<https://doi.org/10.3344/kjp.2021.34.4.509>
9. Menaldi SL, et al. Efficacy of gabapentinoids for acute herpes zoster in preventing postherpetic neuralgia: a systematic review of randomized controlled trials. *J Pain Res* 2022; 15: 123-134.
<https://doi.org/10.5070/d328559238>
10. Lim DZJ, et al. Herpes zoster and post-herpetic neuralgia diagnosis, treatment, and prevention. *Singapore Med J* 2024; 65(2): 80-88.
<https://doi.org/10.3390/pathogens13070596>
11. Gross GE, Eisert L, Doerr HW, Fickenscher H, Wolff MH, Wutzler P, et al. S2k guidelines for the diagnosis and treatment of herpes zoster and postherpetic neuralgia. *J Dtsch Dermatol Ges* 2020; 18(1): 55-78.
<https://doi.org/10.1111/ddg.14027>

12. Mwakingwe-Omari A, et al. Recombinant zoster vaccine in immunocompetent and immunocompromised adults: a systematic review. *Open Forum Infect Dis* 2023; 19(3): 2278362. <https://doi.org/10.1080/21645515.2023.2278362>
13. Mbinta JF, Nguyen BP, Awuni PMA, Paynter J, Simpson CR. Post-licensure zoster vaccine effectiveness against herpes zoster and postherpetic neuralgia in older adults: a systematic review and meta-analysis. *Lancet Healthy Longev* 2022; 3(4): e263-e275. [https://doi.org/10.1016/S2666-7568\(22\)00039-3](https://doi.org/10.1016/S2666-7568(22)00039-3)
14. Ding S, Wen S, Kang H, Zhang H, Guo H, Li Y. Risk factors for postherpetic neuralgia after herpes zoster: a systematic review and meta-analysis of cohort studies. *Pain Ther* 2024; 13(1): 45-62. <https://doi.org/10.1016/j.ijid.2024.107181>
15. Ngo AL, Urits I, Yilmaz M, Fortier L, Motejunas M, Gress K, et al. Postherpetic neuralgia: current evidence on the topical film-forming spray with 5% lidocaine. *J Pain Res* 2020; 13: 1619-1627. <https://doi.org/10.2147/JPR.S252410>
16. Chen N, Li Q, Yang J, Zhou M, Zhou D, He L. Antiviral treatment for preventing postherpetic neuralgia. *Cochrane Database Syst Rev* 2014; 2014(2): CD006866. <https://doi.org/10.1002/14651858.CD006866.pub3>
17. Xu J, Ding Y, Liu B, Wu X, Yang X, et al. A Comparison of Short-Term Peripheral Nerve Stimulation and Pulsed Radiofrequency in the Treatment of Postherpetic Neuralgia. *J Pain Res* 2024; 17: 4583-4590. <https://doi.org/10.2147/jpr.s493000>
18. Lin J, Dobbins T, Wood JG, Bernardo C, Stocks NP, Liu B. Effectiveness of the live-attenuated herpes zoster vaccine 2 years after its introduction in Australia. *Vaccine* 2021; 39(10): 1493-1498. <https://doi.org/10.1016/j.vaccine.2021.01.067>
19. Pan CX, Lee MS, Nambudiri VE. Global herpes zoster incidence, burden of disease, and vaccine availability: a narrative review. *Ther Adv Vaccines Immunother* 2022; 10: 25151355221084535. <https://doi.org/10.1177/25151355221084535>