Efficacy of Narrow-Band Ultra Violet B versus Narrow-Band Ultra Violet B with Topical Tacrolimus Ointment (0.1%) in the Treatment of Vitiligo
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Abstract

\textbf{Introduction:} Several treatment options e.g. topical corticosteroids, phototherapy like narrow-band ultra violet B (NB-UVB) and psoralen*ultra violet A (PUVA) etc are available for vitiligo. But none is so effective in single but combined one is more effective and superior.

\textbf{Objective:} To compare the efficacy of NB-UVB vs NB-UVB with topical Tacrolimus ointment (0.1%) in the treatment of Vitiligo.

\textbf{Materials and Methods:} This descriptive cross-sectional study was conducted in Combined Military Hospital, Dhaka from October 2015 to April 2016. Total 100 patients with vitiligo were divided into 2 groups of 50 patients. NB-UVB was given for 04 weeks to Group-A. In Group-B patients, topical Tacrolimus ointment (0.1%) twice daily was advised with simultaneous NB-UVB. The patients were followed-up at the baseline of the 4th, 8th and 16th week.

\textbf{Results:} Majority (46%) of the patients were from 25-34 years of age with a mean age of 27.4±12.6 years. Among all risk factors, Family history of Vitiligo was the most common risk factor and common skin type (Fitzpatrick) was Type IV (40%). At the end of 4th week, maximum cases of Group-B showed good response (score 3) with a mean score of 1.74. Whereas, maximum cases of Group-A showed poor response (score 1) with a mean score of 0.86. End of the 16th week, maximum cases of Group-B improved successfully. In the end, 20% patients of Group-A showed an excellent result; but it was 42% from Group-B.

\textbf{Conclusion:} It is revealed from this study that patients treated with a combination of NB-UVB with topical Tacrolimus ointment (0.1%) showed better treatment outcome, more effective and becomes a new mode of treatment.

\textbf{Key-words:} Vitiligo, Narrow-band ultra violet B (NB-UVB), Tacrolimus ointment (0.1%).

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broadband and narrowband is used in this technique. Studies suggest that combination therapy with UVB phototherapy and other topical treatments improve clinical outcome, repigmentation. Tacrolimus is a very effective agent for treatment of any form of dermatitis when compared with steroids it has several benefits.

Tacrolimus prevents the release of cytokines, inflammatory mediators in mast cells by degranulation. Lotti T et al found in his study that Tacrolimus is an effective pharmacological agent where 61% of patients showed more than 75% repigmentation when treated with Tacrolimus alone.

Materials and Methods
A descriptive cross-sectional study was conducted in the outpatient department of Dermatology and Venereology, Combined Military Hospital, Dhaka from October 2015 to April 2016. A total of 100 patients diagnosed with vitiligo having criteria of well circumscribed milky white cutaneous macules and patches by Wood's lamp with Fitzpatrick skin type IV-VI were enrolled for the study. Simple random sampling method was applied to sampling population. Patients with any contraindication to phototherapy like skin cancer or pre-malignant skin conditions, photoinduced or photo aggravated dermatoses like SLE, Photodermatitis, etc. and photosensitivity or allergy to Tacrolimus ointment were excluded from the study. Patients were allocated into two groups (Group-A and Group-B). After approval from the hospital ethical committee, the informed consent of the selected patients was obtained. Patients in treatment Group-A was given Narrowband UVB (NB-UVB) and those in Group-B was given Narrowband UVB (NB-UVB) with topical Tacrolimus ointment (0.1%) twice daily for vitiligo patches over the affected area. Response to treatment was measured as percentage of repigmentation and was calculated at 4th, 8th and 16th week. On initial visit, the total vitiliginous area was measured in centimeters. Calculated value (cm) was considered as 100% hypothetically for respective patients and this initial depigmentation values in percentage was referred to as baseline depigmentation. On subsequent visits, the percentage of depigmentation was reassessed and calculated by this formula:

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\% \text{ depigmentation} = \frac{\text{Present depigmentation}}{\text{Baseline depigmentation}} \times 100.
\]

Then improvement or repigmentation was calculated by 100-% depigmentation. The results were scored as-

- No response: dermatological symptoms remain unchanged (0% improvement or no repigmentation).
- Poor response: dermatological symptoms slightly improved (1-25% improvement or repigmentation).
- Moderate response: dermatological symptoms improved (26-50% repigmentation).
- Good response: dermatological symptoms markedly improved (51-75% repigmentation).
- Excellent response: dermatological symptoms mostly disappeared (76-100% repigmentation). On each follow-up day, naked eye skin examination and photographic evaluation were done to see improvement.

The data were analyzed using SPSS and MS Excel.

Results
No significant difference in age was observed between two groups. While studying the distribution of cases by age it was found that majority of the patients i.e. 46% were between 25-34 years of age, 39% were between 14-24 years of age. Mean age was found to be 27.4±12.6 years (Table-I).

<table>
<thead>
<tr>
<th>Duration</th>
<th>No of patients</th>
<th>%</th>
</tr>
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<tbody>
<tr>
<td>1-2 years</td>
<td>29</td>
<td>8.0</td>
</tr>
<tr>
<td>3-4 years</td>
<td>56</td>
<td>56.0</td>
</tr>
<tr>
<td>&gt;5 years</td>
<td>15</td>
<td>15.0</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
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Duration of symptoms ranged from 5 months to maximum 7 years. Out of 100 cases, the majority of cases (56%) attended hospital with the history of vitiligo for 3-4 years duration (Table-II). Common Skin type (Fitzpatrick) was IV (40%), followed by type-V (31%) and type-VI (29%) (Figure-1). Among common risk factors, family history of vitiligo was the most common risk factor present in 29% cases followed by smoking 26% and obesity 19%.

![Fig-1: Distribution of patients according to skin type (Fitzpatrick) (n=100)](image-url)
Follow up and assessment was done in three sessions. At the end of 4th week, maximum cases of Group-B showed good response (score 3) to poor response (score 1) with their current treatment; mean score was 1.74. On the other hand, maximum cases of Group-A showed poor response (score 1) to no response (score 0) with a mean score of 0.86. At the end of 16th week, comparatively maximum cases of Group-B improved successfully (almost normal skin to slight depigmentation). Among both groups, 20% cases and 42% cases showed excellent results in Group-A and Group-B respectively; mean score of two groups being 2.56 and 3.22 respectively (Table-III).

The present study suggested that patients of Group-B who were treated with a combination of NB-UVB with topical Tacrolimus ointment (0.1%) showed excellent treatment outcome than Group-A who were treated with NB-UVB alone. In this study, score range was from 3.22 to 0.86 (normal score range is 0 to 4). Line graph demonstrated that upward direction of the curve implied gradual improvement of score range was from 3.22 to 0.86 (normal score range is 0 to 4). Line graph demonstrated that upward direction of the curve implied gradual improvement of vitiligo. After treatment with NB-UVB with topical Tacrolimus ointment (0.1%), repigmentation level was higher steadily in vitiligo. The present study suggested that patients of Group-B who were treated with a combination of NB-UVB with topical Tacrolimus showed excellent treatment outcome than Group-A who were treated with NB-UVB alone. So the effectiveness of NB-UVB with topical Tacrolimus ointment (0.1%) combination treatment is proven.

Discussion

This study design raised a number of important methodological issues, including patient selection, sample size and the prospective identification of efficacy of therapy, all of which may have exerted a powerful influence on the results. The study showed that the frequency of vitiligo was highest in young age i.e. 25-34 years age group, mean age was found to be 27.4±12.6 years. The disease can appear at any age but more frequently seen in individuals of less than 20 years of age. It affects about 0.1%-2% of general population and familial incidence is about 30%1. Present study demonstrated that duration of symptoms ranged from 5 months to maximum 7 years. Out of 100 cases, the majority of cases (56%) attended the hospital with the history of vitiligo for 3-4 years. Bilal A reported that duration of disease was of < 3 years in 60% and 53.3% cases in Group-A and Group-B, respectively as observed in their study1.

All of the present study findings correlate with the result of other studies. NB-UVB has shown a number of advantages in vitiligo patients in addition to its excellent, efficacy. These advantages include its extremely low side-effect profile particularly on the systemic front, its established use in children and adults and also considered safe in pregnant females12. Majid13 in his study mentioned the effect of combining topical Tacrolimus and NB-UVB therapy in inducing repigmentation in vitiligo lesions and concluded that addition of topical Tacrolimus increases the extent of overall repigmentation achieved with NB-UVB therapy in vitiligo and also reduces the cumulative NB-UVB dose needed to achieve a therapeutic benefit in affected patients of vitiligo. Moreover, the use of Tacrolimus may be useful to prevent UVB induced erythema by inhibiting early-phase events of the inflammatory process14-16.

Satyanarayan HS et al17 reported that in their study seven (33%) patients with the NB-UVB and Tacrolimus combination treatment and 6(28%) with only the NB-UVB treatment, lesions had >75% repigmentation. Though repigmentation was slightly better in the lesions treated with a combination of NB-UVB and Tacrolimus. A recent study by Nordal et al found the combination of NB-UVB and Tacrolimus ointment (0.1%) to be more effective than UV treatment alone in patients with vitiligo18. However, NB-UVB was administered for a minimum 3 months and probably, more patients treated with NB-UVB alone arm would have achieved better re-pigmentation, if phototherapy was given for a longer duration. Other studies with smaller sample size have found better pigmentation in NB-UVB and Tacrolimus arm although the difference was not statistically significant19,20.

Table-III: Evaluation of vitiliginous area and response to treatment during the course of treatment (n=100)

<table>
<thead>
<tr>
<th>Duration</th>
<th>At 4th week</th>
<th>At 8th week</th>
<th>At 16th week</th>
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<tbody>
<tr>
<td></td>
<td>No of patients</td>
<td>%</td>
<td>No of patients</td>
</tr>
<tr>
<td>No response</td>
<td>19</td>
<td>6</td>
<td>50.0</td>
</tr>
<tr>
<td>Poor response</td>
<td>21</td>
<td>13</td>
<td>34.0</td>
</tr>
<tr>
<td>Moderate response</td>
<td>8</td>
<td>19</td>
<td>27.0</td>
</tr>
<tr>
<td>Good response</td>
<td>2</td>
<td>1</td>
<td>34.0</td>
</tr>
<tr>
<td>Excellent response</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Mean score</td>
<td>0.86</td>
<td>1.74</td>
<td>1.56</td>
</tr>
</tbody>
</table>
The present study suggested that Group-B cases or patients treated with a combination of NB-UVB with topical Tacrolimus ointment (0.1%) showed excellent treatment outcome than Group-A. In this study, the score range is from 3.22 to 0.86 (normal scored range is 0 to 4). Line graph demonstrated that upward direction of the curve implied gradual improvement of vitiligo. When using NB-UVB with topical Tacrolimus ointment, repigmentation level was higher steadily than that of Group-A. So the effectiveness of NB-UVB with topical Tacrolimus ointment (0.1%) combination treatment is proven.

Another study by Fai et al. evaluated the efficacy and tolerability of combined treatment with NB-UVB and topical Tacrolimus in vitiligo. Their study demonstrated 42 years as a common age group; repigmentation was evident on more than 70% of lesions and clinical response (repigmentation more than 50%) was observed. A recent study by Nordal et al. assessed the additive effect of Tacrolimus ointment (0.1%) once daily in vitiligo patients treated with NB-UVB and concluded that the combination of NB-UVB and Tacrolimus ointment (0.1%) was more effective than NB-UVB treatment alone in patients with vitiligo.

**Conclusion**

The present study revealed that combined treatment with NB-UVB along with topical Tacrolimus ointment (0.1%) in vitiligo patients is more effective and becomes a new mode of treatment which will be beneficial to the patients of vitiligo. It may also cause quick symptomatic improvement thus decreasing the psychological stress of patients due to cosmetic disfigurement caused by vitiligo.

**References**


