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Systematic Review

Comparison of the Excimer Lamp vs. Narrowband Ultraviolet (Nb-Uvb) Lamp or 308 nm Excimer Laser in Vitiligo Repigmentation: A Systematic Review

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Abstract

Objective: To conduct a systematic review of the literature evaluating the efficacy of the 308 nm excimer lamp in comparison to narrowband ultraviolet B (NB-UVB) and the 308 nm excimer laser for inducing repigmentation in vitiligo. **Methods:** A comprehensive search was performed in PubMed, Embase, Cochrane Library, Scopus, Web of Science, and LILACS databases, as well as in gray literature sources including Google Scholar, OpenGrey, Livivo, and ProQuest. Risk of bias was assessed independently by two blinded reviewers using the Cochrane RoB 2 tool, with disagreements resolved by a third reviewer. The primary outcome was the degree of repigmentation. **Results:** Of 3825 records identified, four randomized controlled trials met the inclusion criteria. The findings suggest that the 308 nm excimer lamp provides superior repigmentation outcomes compared to NB-UVB and demonstrates comparable efficacy to the 308 nm excimer laser. **Conclusions:** Phototherapy using the 308 nm excimer lamp appears effective in promoting repigmentation in vitiligo patients and is associated with minimal adverse effects. Nevertheless, variations in treatment protocols and potential bias across studies warrant cautious interpretation of the results.

Keywords: vitiligo; narrowband ultraviolet (NB-UVB); excimer laser 308 nm; excimer lamp 308 nm

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1. Introduction

Vitiligo is an acquired pigmentary disorder affecting the skin and mucous membranes, characterized by the appearance of well-demarcated, often symmetrical depigmented macules, related to a selective loss of epidermal melanocytes [1]. This pigmentary disorder is the most common among skin diseases, with a frequency of 0.1% to 2% in different populations [2]. Although the disease does not cause systemic complications, the esthetic issue is of great relevance, so social, mental and psychiatric problems can be accompanied [3]. The etiology of vitiligo is still unclear, but factors and hypotheses about its pathogenesis have been attributed to autoimmunity, genetics, oxidative stress, sympathetic neurogenic disorder and the environment [1,3]. In addition, vitiligo may be associated with other autoimmune disorders, including thyroid disease, diabetes mellitus, pernicious anemia, and alopecia areata [4].

Various interventions have been used to treat vitiligo, some based on new discoveries about the possible causes of the disease and aimed at inhibiting the immune response, as well as stimulating repigmentation [5,6]. Traditional treatment options include topical agents, systemic drugs, phototherapy and skin grafting [3]. Among the main phototherapy methods and devices are psoralen plus ultraviolet (UV) A (PUVA), broadband UVB, Narrowband UVB (NB-UVB) and targeted phototherapy using excimer lasers or monochromatic excimer lamps (MEL) are commonly employed treatment modalities, beyond the light-emitting diode (LED) [7].

Narrowband UVB phototherapy (NB-UVB) has emerged in recent years as a widely accepted and well-tolerated therapy, and is one of the most effective treatment modalities for generalized vitiligo. Its overall response is 12.5% to 75% esthetically acceptable repigmentation after about a year of therapy [6,8]. Its mechanism of action is based on immunosuppressive effects, induction of melanocyte differentiation and melanin production [9]. Although this technique has proved successful in many cases, its prolonged duration, which can extend to more than a year, leads certain patients not to adhere to the treatment, which is a drawback due to financial and social reasons [10].

To address the challenge of prolonged UV therapy durations, alternative treatments have been developed for vitiligo, including the 308 nm excimer laser, excimer lamps, and monochromatic excimer light. The excimer laser emits light at a wavelength of 308 nm, generated through a xenon-chlorine gas mixture, which is close to the NB-UVB spectrum—suggesting that these therapies may share similar biological and clinical effects. In this context, the excimer laser offers certain advantages, such as shorter treatment durations and the ability to deliver concentrated energy to targeted areas without affecting surrounding healthy skin [11,12]. Clinical outcomes have shown promising repigmentation on areas such as the face, trunk, arms, and legs. However, its effectiveness is limited on more resistant sites, including the elbows, knees, backs of the hands, fingers, wrists, and feet. Moreover, treating extensive skin areas is challenging due to the small spot size. Another notable drawback is the high cost associated with acquiring and maintaining the equipment [11,13].

Monochromatic excimer lamps (MEL) and 308 nm excimer LEDs, in contrast, emit incoherent ultraviolet radiation generated via reactive gases, producing light at a wavelength of 308 nm. Both the laser and the lamp selectively deliver UVB radiation to affected skin areas, thereby reducing the overall cumulative dose, lowering carcinogenic risk, and minimizing the contrast between depigmented and healthy skin [7]. Although the exact mechanism of action of MEL/LED in vitiligo remains unclear, similar to NB-UVB, the excimer lamp is believed to promote repigmentation, disease stabilization, and maintenance through immunosuppressive and immunomodulatory effects. Notably, MEL/LED therapies appear to have an enhanced capacity to induce T-cell apoptosis, which may serve as an indicator of clinical efficacy [14].

Phototherapy has been employed for many years in the management of vitiligo. However, the introduction of newer devices over the past two decades has raised questions and uncertainty regarding the most effective treatment options. In this context, conducting a systematic literature review becomes essential to evaluate and compare the effects of 308 nm excimer lamp therapy with those of NB-UVB and the 308 nm excimer laser, particularly in terms of their impact on repigmentation in vitiligo patients.

2. Materials and Methods

2.1. Protocol

This systematic review was conducted and reported in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. The

review protocol was registered with the Open Science Framework (https://osf.io/ftkvd, 11 December 2024).

2.2. Eligibility Criteria

The PICOS framework was used to define the research question for this study: P (Population)—individuals with vitiligo; I (Intervention)—excimer lamp therapy; C (Comparison)—excimer laser or narrowband UVB (NB-UVB); O (Outcome)—repigmentation; S (Study design)—randomized clinical trials.

Inclusion criteria: Individuals diagnosed with vitiligo, regardless of disease type, affected body region, or gender. Exclusion criteria: Non-randomized studies and articles unavailable in full text, even after attempts to contact the authors.

2.3. Search Strategies

A comprehensive and sensitive search strategy was implemented without restrictions on language or publication date. The following keywords were employed: "Vitiligo" AND ("Ultraviolet Therapy" OR "Actinotherapy" OR "Lasers" OR "Excimer Lasers") using both Medical Subject Headings (MeSH) and free-text terms in the PubMed database. The search was extended to multiple databases, including PubMed, Embase, Cochrane Library, Scopus, LILACS, and Web of Science. Additionally, gray literature sources such as Google Scholar, OpenGrey, Livivo, and ProQuest were explored. Citation lists from relevant articles were also screened. No limits were set regarding publication period or language. Authors of included studies were contacted when necessary to obtain missing data.

2.4. Selection of Studies

Two independent reviewers (R1 and R2) conducted the article selection process in two stages. In the first stage (Phase 1), they screened titles and abstracts based on the eligibility criteria. In the second stage (Phase 2), they reviewed the full texts and applied the same inclusion criteria. All extracted data were then verified. Any disagreements were resolved by consulting a third reviewer (R3).

2.5. Data Collected

Data were extracted regarding study characteristics (authors, study design, year of publication, and country), intervention type, evaluation methods, outcomes, assessment time points, and conclusions.

2.6. Individual Assessment of the Risk of Bias in Studies

The risk of bias was assessed using the Cochrane Risk of Bias tool (RoB 2) by two independent, blinded reviewers (R1 and R2). Any disagreements were resolved through consultation with a third reviewer (R3). All included studies were evaluated across five domains: the randomization process, deviations from intended interventions, missing outcome data, outcome measurement, and selection of reported results. Each domain was assigned an overall judgment of low risk, some concerns, or high risk of bias.

3. Results

3.1. Study Selection

A total of 4758 records were identified during the search, with 4629 retrieved from the main databases and 129 from the gray literature. The initial search was conducted on 31 July 2024, and updated on 13 March 2025. After excluding 302 records automatically and 534 manually, 3918 studies proceeded to Phase 1, which involved screening titles and abstracts. In Phase 2, 21 full-text articles were assessed for eligibility. Ultimately, four studies met the inclusion criteria and were included in this review (Figure 1).

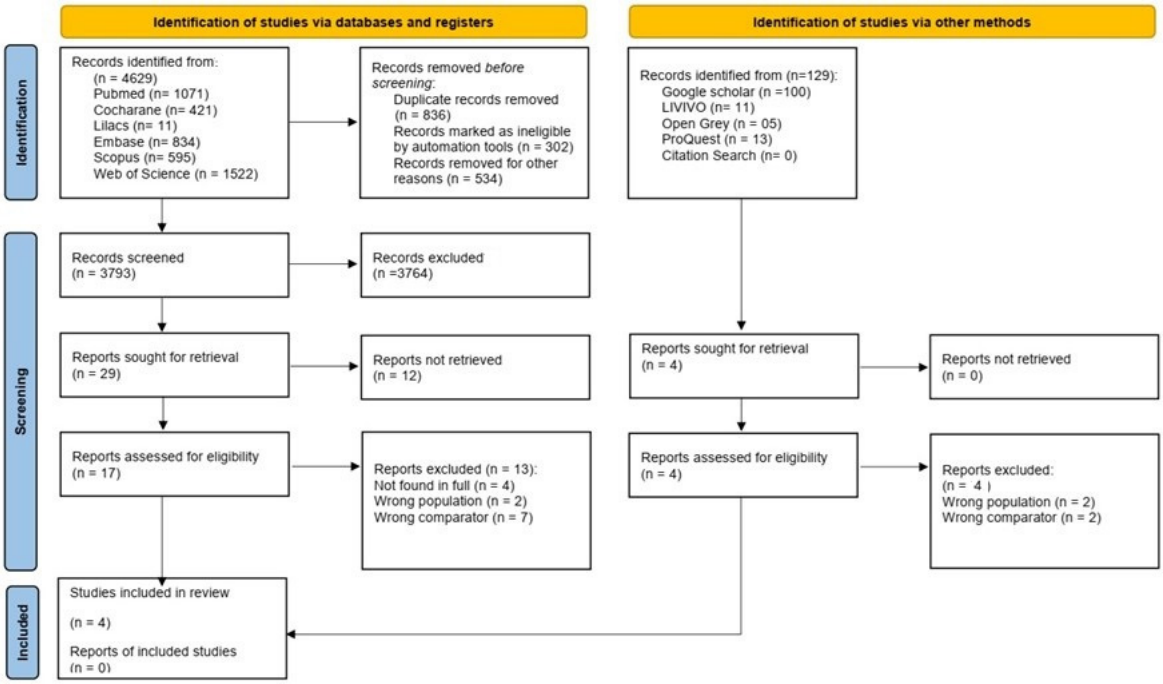


Figure 1. PRISMA 2020 flowchart for new systematic reviews that included searches of databases, registries and other sources.

3.2. Individual Characteristics of the Studies

Table 1 provides a summary of the key characteristics of the four randomized clinical trials included in this review. The studies were conducted in Italy [15], France [16], China [17] and Thailand [18]. The duration of vitiligo among participants ranged from 4 months to 35 years. A total of 83 individuals were enrolled, comprising 35 men and 48 women.

Table 1. Summary of the most important findings of the included randomized clinical trials (n = 4).

Eligible Studies/Country	Sample Description	Intervention Protocol	Body Region	Evaluation Period	Outcomes/Measuring Instruments	Conclusion
Shi et al., 2013 China [17]	N = 14 CG: (n = 14); EG: (n = 14) Sex: CG: 07 (M); 07 (F) EG: 07 (M); 07 (F) Age: CG: 2 to 39 (médium 22.2) EG: 2 to 39 (médium 22.2)	CG: 308 nm excimer laser EG: 308 nm excimer lamp (MEL)	CG: lesion EG: contralateral lesion	T0: Baseline T1: 7 weeks 3 sessions per week	Scale from 0 to 4: (0) no repigmentation (1) poor repigmentation 1–25% (2) moderate repigmentation 26–50% (3) good repigmentation 51–75% (4) excellent repigmentation 76–100%	The 308 nm excimer lamp and the 308 nm excimer laser demonstrate comparable efficacy in the treatment of vitiligo
Casacci et al., 2007 Italy [15]	N = 16 CG: (n = 16); EG: (n = 16) Sex: CG: 06 (M); 10 (F) EG: 06 (M); 10 (F) Age: CG: 16 to 58 (médium 38) EG: 16 to 58 (médium 38)	CG: NB-UVB EG: 308 nm excimer light (LED)	CG: lesion EG: contralateral lesion	T0: Baseline T1: 26 weeks 2 sessions per week	Scale from 0 to 4: (0) no repigmentation; (1) poor repigmentation 1–25%; (2) moderate repigmentation 26–50% (3) good repigmentation 51–75%; (4) excellent repigmentation 76–100%.	Phototherapy using the 308 nm monochromatic excimer lamp (MEL) may offer greater effectiveness than conventional narrowband UVB (NB-UVB) therapy in treating vitiligo

Table 1. *Cont.*

Eligible Studies/Country	Sample Description	Intervention Protocol	Body Region	Evaluation Period	Outcomes/Measuring Instruments	Conclusion
Le Duff et al., 2010 France [16]	N = 17 CG: (n = 17); EG: (n = 17) Sex: CG: 41.17% (M); 50.82% (F) EG: 41.17% (M); 50.82% (F) Age CG: 21 to 54 years (mean age 38) EG: 21 to 54 years (mean age 38)	CG: 308 nm excimer laser EG: 308 nm excimer lamp (MEL)	CG: lesion EG: contralateral lesion	T0: Baseline T1: 12 weeks 2 sessions per week	Scale from 0 to 4: (0) no repigmentation; (1) poor repigmentation 1–25%; (2) moderate repigmentation 26–50% (3) good repigmentation 51–75%; (4) excellent repigmentation 76–100%.	The 308 nm excimer laser and the 308 nm excimer lamp are equally effective in inducing repigmentation in vitiligo
Poolsuwan et al., 2021 Tailândia [18]	N = 36 CG: (n = 36); EG: (n = 36) Sex: CG: 15 (M); 21 (F) EG: 15 (M); 21 (F) Age: CG: 37 to 65 years (mean age 48) EG: 37 to 65 years (mean age 48)	CG: 311 nm NB-UVB EG: 308 nm excimer light (LED)	CG: lesion EG: contralateral lesion	T0: Baseline T1: 16 weeks 3 sessions per week	Scale from 0 to 4: (0) no repigmentation (1) poor repigmentation 1–25% (2) moderate repigmentation 26–50% (3) good repigmentation 51–75% (4) excellent repigmentation 76–100%	The 308 nm excimer light may be highly effective and promote faster repigmentation compared to conventional targeted NB-UVB therapy

Legend: NB: narrowband; M: male; F: female; UVB: ultra violet B; EG: experimental group; CG: control group.

3.2.1. Types of Vitiligo/Classification of Sun-Reactive Skin

The studies analyzed include various types of vitiligo and consider the classification of patients' skin based on sun-reactivity. The four studies included people with generalized vitiligo, with at least two symmetrical lesions on the body. Shi et al. [17] classified patients into stable and active vitiligo. Casacci et al. [15] used the extensive and limited clinical types to separate the patients, with nine presenting the extensive type and seven the limited type. In Le Duff's study et al. [16] The specific type of vitiligo in the patients was not reported; however, the average disease duration was 17 years, ranging from 3 to 35 years. And in Poolsuwan's study et al. [18] only patients with stable, non-segmental vitiligo were included. All the studies assessed the patients' skin type according to the Fitzpatrick scale: 9 patients had phototype II, 26 had phototype III, 25 had phototype IV and 17 had phototype V.

3.2.2. Evaluation of Repigmentation

All studies included in this review assessed repigmentation through photographic analysis. For example, in the study by Casacci et al. [15], vitiligo control was carried out through clinical examination and photographic analysis. To measure the progress of the treatment, a 5-point scale was used, ranging from 0 (no repigmentation) to 4 (excellent repigmentation, between 76 and 100%). In addition to the amount of repigmentation, its pattern was also observed, classified as follicular, peripheral or combined.

Similarly, Le Duff et al. [16] assessed repigmentation by comparing photographs. Repigmentation was quantified using a scoring system from 0 to 4, with the higher the score, the higher the rate of repigmentation. Shi et al. [17] assessed repigmentation through direct visual inspection of the lesions and photographic analysis. Repigmentation was assessed using a 5-point scale, ranging from 0 (no repigmentation) to 4 (excellent repigmentation, between 76 and 100% of the affected area).

In the study by Poolsuwan et al. [18], repigmentation was assessed using the Vitiligo Area Scoring Index (VASI) and a 5-point scale. The VASI measured the reduction in depigmentation by categorizing depigmented areas from 100% (no repigmentation) to 10% (minimal presence of depigmentation). Repigmentation was also classified in grades from 0 to 4, where 0 indicated no repigmentation and 4 represented excellent repigmentation (76–100% of the treated area).

3.2.3. Duration of Treatment and Frequency of Intervention

The four studies analyzed differed in terms of treatment duration, frequency of sessions, initial dose and dose progression over the course of treatment. In the study by Shi et al. [17], the most intensive treatment lasted 20 weeks, with 3 sessions/week, for a total of 60 sessions. Poolsuwan et al. [18] also carried out three sessions a week for 16 weeks, totaling 48 sessions. Casacci et al. [15], on the other hand, the interventions were carried out over 6 months, with two sessions per week, also totaling 48 sessions. And finally, with a less intensive treatment, Le Duff et al. [16] completed the treatment in 12 weeks, also with two sessions a week for a total of 24 sessions.

3.2.4. Initial Dose and Treatment Progression

The initial dose, as well as the progression of treatment, was also established differently between the studies.

Shi et al. [17] used an initial dose of 200 mJ for men and 150 mJ for women and individuals under the age of 16. The dose progression was adjusted throughout the sessions: increases of 20% in sessions 1 to 10, 10% in sessions 11 to 13, 5% in sessions 14 to 16 and 2% in sessions 17 to 20.

Taking a different approach, Casacci et al. [15] initiated treatment with a dose corresponding to 70% of the previously determined Minimum Erythema Dose (MED). Dose increments were set at 40% for sessions 1 to 4, 30% for sessions 5 to 8, and 20% from the ninth session onward, continuing until mild erythema was observed.

Le Duff et al. [16], on the other hand, based their initial dose on the DEM obtained for each patient. If there was a difference between the modalities (lamp or laser), the lowest dose was used as a reference. The dose was increased by 50 mJ/cm^2 every two sessions.

Finally, in the study by Poolsuwan et al. [18], the initial dose was fixed at 150 mJ/cm^2 for all participants. In the first four sessions, the dose was increased by 15%, and in subsequent sessions, the increase was 10% until the end of treatment.

3.2.5. Evaluating Effectiveness

In the study by Casacci et al. [15], treatment efficacy was evaluated by the number of sessions needed to reach moderate repigmentation (score 2), the final repigmentation score at study completion, the number of sessions required to induce follicular repigmentation, and the number of sessions and average UV dose necessary to achieve combined follicular and peripheral repigmentation.

Le Duff et al. [16] defined treatment success as achieving more than 50% repigmentation (scores 3 and 4). Similarly, Shi et al. [17] evaluated the proportion of patients reaching at least 50% and 75% repigmentation, in addition to considering average repigmentation scores across five treatment intervals, the average time to repigmentation onset, and the response rates of vitiligo lesions at various body sites. Lastly, Poolsuwan et al. [18] assessed treatment effectiveness based on the average time required to reach moderate repigmentation (grade 2) and the final repigmentation observed after 48 treatment sessions.

3.2.6. Side Effects

Across the vitiligo treatment studies, the most common adverse effects were primarily related to erythema. In the study by Shi et al. [17], persistent mild erythema was reported in 85.7% of patients treated with the excimer lamp and 92.2% of those treated with the laser, though it was generally well tolerated.

In the study by Casacci et al. [15], side effects were limited to symptomatic erythema in 56.2% of patients during the first 12 treatment sessions. Le Duff et al. [16], reported one case of blistering during treatment with the lamp and three cases with the excimer laser. Additionally, most patients experienced persistent erythema with the lamp, which did not affect treatment tolerance. Poolsuwan et al. [18] used a phototoxicity grading scale to categorize side effects: grade 1 for mild perceptible erythema, grade 2 for asymptomatic, well-defined erythema, grade 3 for persistent symptomatic erythema lasting more than 24 h, and grade 4 for severe erythema with edema or blisters. They found that 38.89% of patients treated with 308 nm excimer light experienced grade 3 phototoxicity, compared to 30.55% of those treated with 311 nm NB-UVB.

3.3. Risk of Study Bias

The forty-three studies presented different levels of risk of bias. Shi et al. [17] and Casacci et al. [15] presented a high overall risk of bias, mainly due to problems in the randomization process and in the selection of reported results, although they demonstrated a good process for measuring outcomes, handling missing data and did not deviate from the planned interventions. Only Casacci et al. [15] reported issues related to missing data during treatment. Le Duff et al. [16] and Poolsuwan et al. [18] were assessed as having a moderate overall risk of bias, demonstrating robust outcome measurement and handling of missing data, but with some uncertainties regarding the randomization process and selection of reported results. These uncertainties may impact the reliability of their findings (Figure 2).

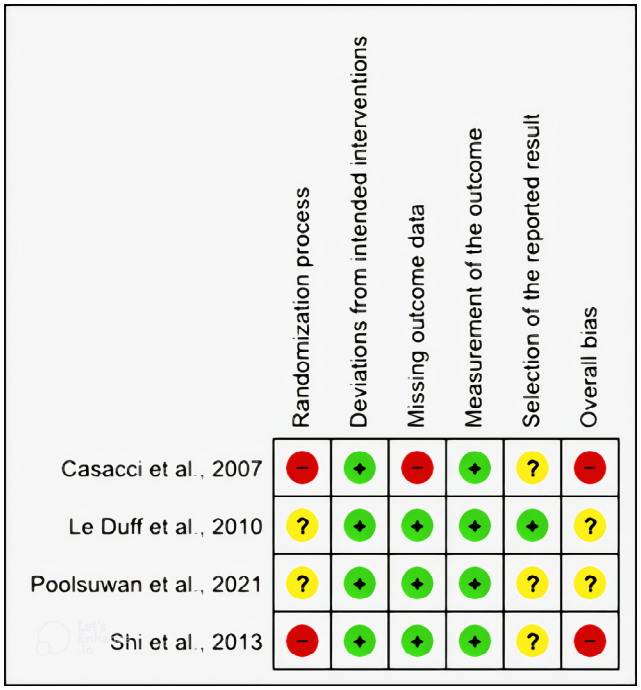


Figure 2. Risk of bias summary: review authors' judgements about each risk of bias item for each included study [15–18].

Figure 3 presents an analysis of the risk of bias of the studies, showing the distribution of risks in different domains. Regarding deviations from the planned interventions and measurements of outcomes, most of the studies were well conducted, with a low risk of bias. However, there were some concerns about the selection of the studies reported. The randomization process and missing data presented a high risk of bias in some cases, impacting the overall bias, which was considered high in 50% of the studies evaluated.

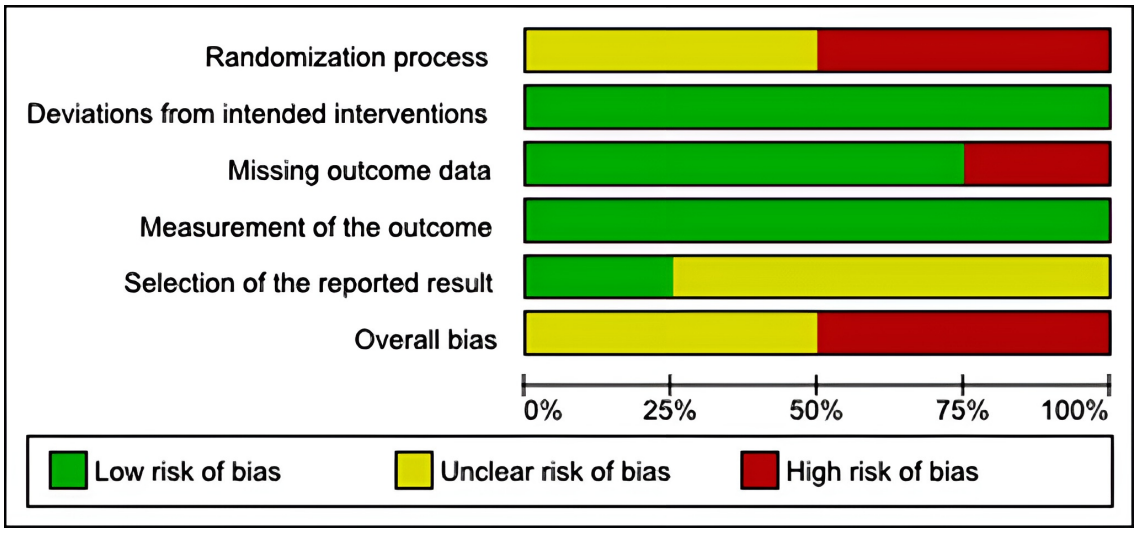


Figure 3. Risk of bias graph: review authors' judgements about each risk of bias item presented as percentages across all included studies.

4. Discussion

This systematic review aimed to evaluate the efficacy of randomized experimental protocols comparing phototherapy using an excimer lamp with narrow-band ultraviolet B (NB-UVB) or the 308 nm excimer laser in the treatment of vitiligo. Despite the limited number of included studies and potential biases, the results were generally encouraging regarding the effectiveness of the excimer lamp technique.

The comparison between the studies reveals important differences in the intervention protocols. Thus, a limitation of this review was that the four studies analyzed showed discrepancies in the protocols, reinforcing the need to standardize treatment parameters, especially about determining the initial dose, frequency of sessions and dose progression strategy. This standardization would allow for better comparability between the studies and would help define more effective protocols for clinical treatment.

An important difference was the criterion for determining the initial dose. Casacci et al. [15] and Le Duff et al. [16] sought to individualize the treatment based on the MED, while Shi et al. [17] and Poolsuwan et al. [18] established fixed values, without considering individual variations in the response to treatment. In addition, the number of sessions and dose progression varied widely, which may have influenced the therapeutic efficacy observed in each study. Treatment duration varied from 12 weeks [15] to 6 months [14], indicating different approaches to the time needed to achieve effective clinical results. The frequency of sessions also varied, while Casacci et al. [15] and Le Duff et al. [16] opted for two sessions per week, Poolsuwan et al. [18] implemented a more intensive regimen of three sessions per week. This variation in the number of sessions and total treatment time may have influenced the clinical outcomes observed between the studies.

Various interventions have been developed to promote skin repigmentation. These methods aim to stimulate melanocyte migration and proliferation by increasing the ET-1.6 peptide levels, as well as enhancing the number and growth of melanocytes [5,19].

Conventional phototherapies include psoralen plus ultraviolet A (PUVA), narrow-band ultraviolet B (NB-UVB), excimer lamp, and the 308 nm excimer laser [20]. NB-UVB therapy is considered the first-line and preferred treatment for generalized vitiligo [21].

Since Westerhof and Nieuweboer-Krobotova [22] reported in 1997 that treatment with NB-UVB alone showed greater efficacy compared to PUVA, with 67% of patients receiving NB-UVB showing re-pigmentation compared to 46% of patients receiving PUVA, NB-UVB has gradually established itself as one of the safest and most effective Methods for treating vitiligo aim to achieve repigmentation, and NB-UVB therapy promotes this by stimulating functional melanocyte precursors in the skin to divide, migrate, and differentiate into mature melanocytes. Additionally, NB-UVB reduces the release of several cytokines (IFN-gamma, IL-12, IL-17A, CXCL9, and CXCL10), prevents melanocyte destruction, and enhances melanin synthesis [23,24].

Yashar et al. [25] reported that NB-UVB monotherapy was effective, with 39% of 71 vitiligo patients exhibiting significant improvement. Similarly, Scherschun et al. [26], found that five out of seven patients achieved more than 75% repigmentation after an average of 19 treatment sessions. Although several subsequent studies have supported the use of NB-UVB as monotherapy for vitiligo, response rates have varied considerably. This lack of standardization hinders researchers' ability to critically analyze outcomes and make meaningful comparisons [27,28].

The 308 nm excimer laser was initially introduced for vitiligo treatment in 1997 by Bónis et al. [29], originally developed as a therapy for psoriasis. However, it was not until 2007 that the U.S. Food and Drug Administration (FDA), a federal agency under the Department of Health and Human Services, approved its use for both vitiligo and psoriasis [20]. Over the past decade, numerous reports have underscored the excimer laser's value in vitiligo management [19,30]. The monochromatic wavelength of 308 nm offers photobiological effects that theoretically exceed those of narrow-band UVB (NB-UVB). UVB primarily targets DNA within epidermal cells, including keratinocytes and melanocytes. This exposure reduces T lymphocyte proliferation by inducing apoptosis via DNA damage, with 308 nm identified as the most efficient wavelength for causing DNA lesions in lymphocytes, emphasizing its importance in treatments aimed at modulating the immune response [31]. Monochromatic excimer lamps (MEL) and LEDs have gained prominence in dermatological phototherapy, particularly due to their high intensity and favorable cost–benefit ratio. Similar to the excimer laser, a major advantage of MEL or LED monotherapy is the ability to deliver high-intensity radiation precisely to affected areas, thereby minimizing exposure and potential side effects to healthy skin. Moreover, several studies have demonstrated that the 308 nm MEL is as effective as the 308 nm excimer laser in inducing repigmentation [32,33].

Leone's study et al. [34] reported that 49% of patients achieved grade 4 repigmentation after three months, a result higher than that observed in early studies on NB-UVB efficacy. Although research on the use of 308 nm LEDs for vitiligo treatment remains limited, the available evidence supports the findings of this review. For instance, Casacci et al. [15] found that six lesions (37.5%) treated with 308 nm excimer light reached a repigmentation score of 4, compared to only one lesion (6%) treated with NB-UVB. Moreover, NB-UVB required more treatment sessions to achieve results comparable to those of LED therapy. Similarly, Poolsuwan et al. [18] observed that 25% of lesions treated with LED achieved grade 4 repigmentation, whereas only 13.89% of lesions treated with NB-UVB reached the same level.

Phototherapy is widely recognized as a cornerstone in the treatment of vitiligo; however, uncertainty remains regarding the optimal modality. Variability in treatment response, the occurrence of side effects, and the limited number of studies on newer therapies

highlight the need for individualized treatment approaches and further large-scale research to validate these findings. Although all four studies included in this systematic review employed the 308 nm excimer lamp, differences in treatment protocols and evaluation methods—such as varying treatment durations and repigmentation assessment criteria—introduce potential biases and complicate direct comparisons. Another important limitation of this review was the fact that only four studies met the inclusion criteria. Therefore, standardizing evaluation methods is crucial to enhance comparability across studies and protocols, facilitating more robust meta-analyses in the future. As a clinical implication, the use of 308 nm excimer lamp demonstrates to be an important form of treatment for patients with vitiligo aimed at repigmentation.

5. Conclusions

Phototherapy using a 308 nm excimer lamp demonstrates significant improvement in repigmentation for patients with vitiligo, with relatively few side effects compared to other treatment modalities. However, the variability in treatment protocols and evaluation methods, along with the risk of bias in the included studies, warrants cautious interpretation of these results. But clinically, the following are recommended therapeutic resources.

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