



# Compliance and phototherapy

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**Abstract** When beginning a phototherapy regimen for a patient, consideration of compliance rates is important. Compliance to phototherapy can be affected by several factors, including the grade of discomfort and side effects from therapy, failure of previous therapies, accessibility and convenience to reach the phototherapy center, grade of improvement during phototherapy, patient relief due to light therapy, and rapport with staff. Understanding how these factors can affect patient adherence can allow for phototherapy regimens to be tailored in a manner that optimizes health outcomes and allows for proper patient selection.

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## Patient compliance in phototherapy

Optimizing patient compliance is an important consideration when beginning any medical therapy. Noncompliance can reduce the efficacy of treatment or render treatment completely nonefficacious, leading to adverse outcomes on patient health. In 2009, the New England Healthcare Institute estimated that general medication noncompliance resulted in an avoidable cost burden of up to \$290 billion per year. Chronic diseases faced the worst compliance rates, with medication adherence tending to decrease over time.<sup>1</sup> Many common dermatologic diseases are treated for an extended period, and the prescribed interventions face similar nonadherence rates. In a study looking at patients with psoriasis being treated with pharmacologic interventions, as many as 30.7% never redeemed one or more of their prescriptions.<sup>2</sup> Adherence rates to all dermatologic treatment modalities have been estimated at 55% to 66%, depending on the study.<sup>3</sup> Phototherapy treatment regimens offer a unique modality in treatment, but as a result they present a unique set of barriers to patient

compliance. Physicians should keep these barriers in mind when creating treatment plans.

Compliance rates in phototherapy regimens can be equally poor. Depending on the entity, compliance may vary. Compliance to phototherapy can be affected by several factors, including the grade of discomfort the entity can cause, failure of previous therapies, accessibility and convenience to reach the phototherapy center, grade of improvement during phototherapy, patient relief due to light therapy, and rapport with nursing staff.

One limited study looked at compliance rates and causes of noncompliance in all patients of the clinic undergoing phototherapy treatment for vitiligo in a 4-year period. It found that 47% of patients stopped treatment within 4 weeks, and only 17% were adherent to the treatment regimen 1 year later.<sup>4</sup> Vitiligo is not rapidly responsive to treatment and requires regular visits for an extended period to demonstrate visible results. Patients in this study had visits twice weekly for several months or longer, requiring considerable time commitment and cost.<sup>4</sup> A second study, looking at vitiligo adherence in 106 patients, measured adherence by the number of treatment sessions attended before loss to follow-up; 39% of patients stopped attending sessions before reaching 60 in total.<sup>5</sup>

Psoriasis phototherapy treatment faces similar rates of non-adherence. A large study of 851 patients investigated patient

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loss to follow-up during an extended bi-weekly phototherapy regimen. Patients were considered compliant if they completed 20 sessions. The study found that 53% of patients became noncompliant within that time.<sup>5</sup>

Some evidence suggests that patient adherence is better in phototherapy than in pharmacologic treatment regimens. One study looking at general adherence rates in psoriasis treatment measured adherence on a Likert scale, allowing patients to subjectively grade their adherence on a five-point scale from “always adherent” to “never adherent.” The study found that 72% of 36 eligible patients were “always” compliant with phototherapy, whereas only 26% of 97 eligible patients were “always” compliant with topical therapy; this difference was statistically significant.<sup>6</sup> A second study comparing acitretin treatment to home phototherapy found that acitretin adherence decreased over time, whereas phototherapy adherence remained consistent.<sup>7</sup> One study investigated patient satisfaction with different modalities of psoriasis treatment. It found that patient “global satisfaction” was higher for phototherapy than it was for topical treatment by a statistically significant margin. Additionally, phototherapy had lower dissatisfaction rates in all subcategories investigated, including safety, information provision, and convenience.<sup>8</sup> This indicates that phototherapy may be considered to increase compliance in patients who are nonadherent to pharmacologic treatment.

Upon reaching clearance of their disease, patients are often given maintenance instructions that may include some pharmacologic treatment. Nonadherence at this stage is also associated with poor outcomes. One study followed 77 patients after clearance of their psoriasis through ultraviolet B (UVB) phototherapy; 8% of patients were largely nonadherent and 61% were occasionally nonadherent, as evaluated on a Likert scale. Increased levels of nonadherence were negatively correlated with the Psoriasis Area and Severity Index (PASI) at 3- and 6-month follow-up, compared with the baseline PASI taken after clearance by phototherapy. This decrease was associated with a Pearson correlation coefficient of  $-.50$  and  $-.59$ , respectively.<sup>9</sup> Patients should be counseled that maintenance therapy is important to adhere to maintain results, even if their clinical condition appears to be improved.

It has been observed that compliance rates are often higher in clinical trials than they are in the general population. This effect is known as the Hawthorne effect and has been partially attributed to patients altering their behavior when they know that they are being observed. It has been suggested that adherence to pharmacologic treatments for dermatologic diseases may be increased if patients are provided more oversight of their treatment, thus replicating this effect in a clinical setting; one suggested clinical application is through the use of “virtual office visits” that require patients to fill out regular surveys for their physicians to review.<sup>10</sup> This may provide an explanation for improved patient compliance with phototherapy in comparison to topical treatments, as patients are afforded more oversight with regular visits. Practitioners may also consider using increased oversight to help patients maintain clearance of their disease after phototherapy.

## Patient-centric reasons for nonadherence

Several factors have been identified in relation to adherence with phototherapy. In one study looking at adherence to vitiligo phototherapy treatment, several factors were found to be positively correlated with adherence. These effects included younger age, higher educational level, increased number of lesions, having lesions in visible locations, and increased belief in the efficacy of treatment. All of these relationships were found to be statistically significant, except for educational level<sup>3</sup>; however, one broad review of adherence to all modes of treatment for all dermatologic disease found that patient demographics, including age, had little to no effect on adherence.<sup>3</sup> Currently, there is limited evidence investigating the role of demographics on phototherapy compliance, and more study is required.

In a study looking at psoriasis treatment compliance, patients were assessed on the self-assessed PASI and Dermatologic Life Quality Index (DLQI) before initiating treatment. These scores were both positively correlated with increased compliance with phototherapy regimens, indicating that individuals more severely affected by their disease were more likely to remain adherent to treatment.<sup>6</sup> This may be due to an increased impact of disease on the patients’ lifestyles, as well as increased visibility of disease, creating incentive to remain adherent.

The need for frequent office visits adds an additional barrier to phototherapy that is not seen in topical and systemic treatments. One cohort of 851 patients showed an inverse relationship between distance to the phototherapy clinic and adherence. Patients who lived more than 20 km from the phototherapy center were less likely to remain adherent than those who lived closer, with a statistically significant odds ratio of 1.18.<sup>5</sup> An analysis of the cost of commuting may partially explain this phenomenon. A patient who undergoes phototherapy 3 times a week for 12 weeks and needs to travel 20 miles each way can pay \$922 in gas costs alone. This cost is magnified by lost income from taking time off from work to attend visits, adding a significant hidden cost that likely impacts patient adherence.<sup>11</sup> These factors should be taken into account when selecting patients and creating a phototherapy regimen, and patients should be informed of the possible impact of these “hidden” costs.

Some comorbid conditions may affect a patient’s likeliness to remain adherent. For example, one study of patients undergoing treatment for psoriasis found that patients with major depression (MDD) placed more importance on treatment duration, and desired treatments that required less time commitment.<sup>12</sup> It then follows that these patients may be less adherent to office phototherapy, as this requires a larger time commitment from the patient, though the sample of patients with MDD who received phototherapy in this study was not sufficiently large enough to assess this claim. Patients with cardiovascular disease, on the other hand, placed more emphasis on the probability of side effects.<sup>12</sup> These patients, therefore,

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