

Factors Influencing Patient Preferences for Phototherapy: A Survey Study

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PRACTICE POINTS

- Patients have different priorities when selecting phototherapy, including safety, costs, effectiveness, insurance issues, and convenience.
- By offering and educating patients on all forms of phototherapy, dermatologists may help guide patients to their optimal treatment plan according to patient priorities.

There is limited literature regarding patient preferences for phototherapy. Patients may consider different forms of phototherapy depending on a multitude of factors important to them, including safety, cost, efficacy, insurance issues, and convenience. This study aimed to determine which form of phototherapy—in-office UVB, at-home UVB, home tanning, salon tanning, and sunbathing—was preferred by survey participants and the reasons for their preferences. Additionally, participants were asked which forms of phototherapy they considered safest and most efficacious, cost-effective, and convenient.

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Phototherapy—particularly UVB phototherapy, which utilizes UVB rays of specific wavelengths within the UV spectrum—is indicated for a wide variety of dermatoses. In-office and at-home UVB treatments commonly are used, as are salon tanning and sunbathing. When selecting a form of phototherapy, patients are likely to consider safety, cost, effectiveness, insurance issues, and convenience. Research on patient preferences; the reasons for these preferences; and which options patients perceive to be the safest, most cost-effective, efficacious, and convenient is lacking. We aimed to assess the forms of phototherapy that patients would most consider using; the factors influencing patient preferences; and the forms patients perceived as the safest and most cost-effective, efficacious, and convenient.

Methods

Study Participants—We recruited 500 Amazon Mechanical Turk users who were 18 years or older to complete our REDCap-generated survey. The study was approved by the Wake Forest University institutional review board (Winston-Salem, North Carolina).

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Evaluation—Participants were asked, “If you were diagnosed with a skin disease that benefited from UV therapy, which of the following forms of UV therapy would you consider choosing?” Participants were instructed to choose all of the forms they would consider using. Available options included in-office UV, at-home UV, home tanning, salon tanning, sunbathing, and other. Participants were asked to select which factors—from safety, cost, effectiveness, issues with insurance, convenience, and other—influenced their decision-making; which form of phototherapy they would most consider along with the factors that influenced their preference for this specific form of phototherapy; and which options they considered to be safest and most cost-effective, efficacious, and convenient. Participants were asked to provide basic sociodemographic information, level of education, income, insurance status (private, Medicare, Medicaid, Veterans Affairs, and uninsured), and distance from the nearest dermatologist.

Statistical Analysis—Descriptive and inferential statistics (χ^2 test) were used to analyze the data with a significance set at $P < .05$.

Results

Five hundred participants completed the survey (Table 1).

Factors Influencing Patient Preferences—When asked to select all forms of phototherapy they would consider, 186 (37.2%) participants selected in-office UVB, 263 (52.6%) selected at-home UV, 141 (28.2%) selected home tanning, 117 (23.4%) selected salon tanning, 191 (38.2%) selected sunbathing, and 3 (0.6%) selected other. Participants who selected in-office UVB as an option were more likely to also select salon tanning ($P < .012$). No other relationship was found between the UVB options and the tanning options. When asked which factors influenced their phototherapy preferences, 295 (59%) selected convenience, 266 (53.2%) selected effectiveness, 220 (44%) selected safety, 218 (43.6%) selected cost, 72 (14.4%) selected issues with insurance, and 4 (0.8%) selected other.

Forms of Phototherapy Patients Consider Using—When asked which form of phototherapy they would most consider using, 179 (35.8%) participants selected at-home UVB, 108 (21.6%) selected sunbathing, 92 (18.4%) selected in-office UVB, 62 (12.4%) selected home-tanning, 57 (11.4%) selected salon tanning, 1 (0.2%) selected other, and 1 participant provided no response ($P < .001$).

Reasons for Using Phototherapy—Of the 179 who selected at-home UVB, 125 (70%) cited convenience as a reason. Of the 108 who selected salon tanning as their top choice, 62 (57%) cited cost as a reason. Convenience ($P < .001$), cost ($P < .001$), and safety ($P = .023$) were related to top preference. Issues with insurance did not have a statistically significant relationship with the top preference. However, participant insurance type was related to top phototherapy preference ($P = .021$), with privately insured patients more likely to select in-office UVB, whereas those with Medicaid and Medicare were more

likely to select home or salon tanning. Efficacy was not related to top preference. Furthermore, age, gender, education, income, and distance from nearest dermatologist were not related to top preference.

In-office UVB was perceived to be safest ($P < .001$) and most efficacious ($P < .001$). Meanwhile, at-home UVB was selected as most convenient ($P < .001$). Lastly, sunbathing was determined to be most cost-effective ($P < .001$) (Table 2). Cost-effectiveness had a relationship ($P < .001$) with the participant's insurance, as those with private insurance were more likely to select at-home UVB, whereas those with Medicare or Medicaid were more likely to select the tanning options. Additionally, of the 54 uninsured participants in the survey, 29 selected sunbathing as the most cost-effective option.

Comment

Phototherapy Treatment—UVB phototherapy at a wavelength of 290 to 320 nm (311–313 nm for narrowband UVB) is used to treat various dermatoses, including psoriasis and atopic dermatitis. UVB alters skin cytokines, induces apoptosis, promotes immunosuppression, causes DNA damage, and decreases the proliferation of dendritic cells and other cells of the innate immune system.¹ In-office and at-home UV therapies make use of UVB wavelengths for treatment, while tanning and sunbathing contain not only UVB but also potentially harmful UVA rays. The wavelengths for indoor tanning devices include UVB at 280 to 315 nm and UVA at 315 to 400 nm, which are similar to those of the sun but with a different ratio of UVB to UVA and more intense total UV.² When in-office and at-home UVB options are not available, various forms of tanning such as salon tanning and sunbathing may be alternatives that are widely used.³ One of the main reasons patients consider alternative phototherapy options is cost, as 1 in-office UVB treatment may cost \$140, but a month of unlimited tanning may cost \$30 or perhaps nothing if a patient has a gym membership with access to a tanning bed. Lack of insurance benefits covering phototherapy can exacerbate cost burden.⁴ However, tanning beds are associated with an increased risk for melanoma and nonmelanoma cancers.^{5,6} Additionally, all forms of phototherapy are associated with photoaging, but it is more intense with tanning and heliotherapy because of the presence of UVA, which penetrates deeper into the dermis.⁷ Meanwhile, for those who choose UVB therapy, deciding between an in-office and at-home UVB treatment could be a matter of convenience, as patients must consider long trips to the physician's office; insurance status, as some insurances may not cover at-home UVB; or efficacy, which might be influenced by the presence of a physician or other medical staff. In many cases, patients may not be informed that at-home UVB is an option.

Patient Preferences—At-home UVB therapy was the most popular option in our study population, with most participants (52.6%) considering using it, and 35.9% choosing it as their top choice over all other phototherapy

TABLE 1. Sociodemographic Data of Participants (N=500)

Variable	Participants, n (%)	Variable	Participants, n (%)
Age, y		Level of education	
18–30	164 (32.8)	Less than or some high school	10 (2.0)
31–40	207 (41.4)	High school or GED	76 (15.2)
41–50	76 (15.2)	Associate degree or some college	83 (16.6)
51–60	38 (7.6)	Bachelor's degree	250 (50.0)
61–70	14 (2.8)	Graduate school	81 (16.2)
71–80	1 (0.2)	Participant yearly income, \$	
Gender		<15,000	100 (20.0)
Male	274 (54.8)	15,000–24,999	82 (16.4)
Female	226 (45.2)	25,000–34,999	73 (14.6)
Race		35,000–49,999	75 (15.0)
American Indian or Alaska Native	24 (4.8)	50,000–74,999	72 (14.4)
Asian	159 (31.8)	75,000–99,999	46 (9.2)
Black or African American	35 (7.0)	100,000–149,999	37 (7.4)
White	255 (51.0)	150,000–199,999	9 (1.8)
Native Hawaiian or other Pacific Islander	1 (0.2)	>200,000	6 (1.2)
>1 race	17 (3.4)	Participant insurance status	
No response	9 (1.8)	Private	270 (54.0)
Ethnicity		Medicaid	68 (13.6)
Hispanic or Latino	96 (19.2)	Medicare	100 (20.0)
Not Hispanic or Latino	356 (71.2)	Veterans Affairs	8 (1.6)
Unknown	46 (9.2)	Uninsured	54 (10.8)
No response	2 (0.4)	Distance from nearest dermatologist, mi	
		0–4	180 (36.0)
		5–10	217 (43.4)
		11–20	67 (13.4)
		>20	36 (7.2)

Abbreviation: GED, General Education Development.

TABLE 2. Participant Phototherapy Preferences (N=500)

Variable	Participants, n (%)
Safest	
In-office UVB ^a	131 (26.2)
At-home UVB	119 (23.8)
Home tanning	62 (12.4)
Salon tanning	66 (13.2)
Sunbathing	120 (24.0)
Other	2 (0.4)
Most effective	
In-office UVB ^a	134 (26.8)
At-home UVB	121 (24.2)
Home tanning	75 (15.0)
Salon tanning	80 (16.0)
Sunbathing	88 (17.6)
Other	2 (0.4)
Most convenient	
In-office UVB	53 (10.6)
At-home UVB ^a	201 (40.2)
Home tanning	99 (19.8)
Salon tanning	43 (8.6)
Sunbathing	102 (20.4)
No response	2 (0.4)
Most cost-effective	
In-office UVB	68 (13.6)
At-home UVB	135 (27.0)
Home tanning	71 (14.2)
Salon tanning	58 (11.6)
Sunbathing ^a	166 (33.2)
Other	1 (0.2)
No response	1 (0.2)

^aSignificant result ($P < .001$).

options. Safety, cost, and convenience were all found to be related to the option participants would most consider using. Prior analysis between at-home UVB and in-office UVB for the treatment of psoriasis determined that at-home UVB is as safe and cost-effective as in-office UVB without the inconvenience of the patient having to take time out of the week to visit the physician’s office,^{8,9} making at-home UVB an option dermatologists may strongly consider for patients who value safety, cost, and convenience. Oddly, efficacy was not related to the top preference, despite being the second highest-cited factor (53.2%) for which forms of phototherapy participants would consider using. For insurance coverage, those with Medicaid and Medicare selected the cheaper tanning options with higher-than-expected frequencies. Although problems with insurance were not related to the top preference, insurance status was related, suggesting that preferences are tied to cost. Of note, while the number of dermatologists that accept Medicare has increased in the last few years, there still remains an uneven distribution of phototherapy clinics. As of 2015, there were 19 million individuals who qualified for Medicare without a clinic within driving distance.¹⁰ This problem likely also exists for many Medicaid patients who may not qualify for at-home UVB. In this scenario, tanning or heliotherapy may be effective alternatives.

In-Office vs At-Home Options—Although in-office UVB was the option considered safest (26.2%) and most efficacious (26.8%), it was followed closely by at-home UVB in both categories (safest, 23.8%; most efficacious, 24.2%). Meanwhile, at-home UVB (40.2%) was chosen as the most convenient. Some patients consider tanning options over in-office UVB because of the inconvenience of traveling to an appointment.¹¹ Therefore, at-home tanning may be a convenient alternative for these patients.

Considerations—Although our study was limited to an adult population, issues with convenience exist for the pediatric population as well, as children may need to miss multiple days of school each week to be treated in the office. For these pediatric patients, an at-home unit is preferable; however, issues with insurance coverage remain a challenge.¹² Increasing insurance coverage of at-home units for the pediatric population therefore would be most prudent. However, when other options have been exhausted, including in-office UVB, tanning and sunbathing may be viable alternatives because of cost and convenience. In our study, sunbathing (33.2%) was considered the most cost-effective, likely because it does not require expensive equipment or a visit to a salon or physician’s office. Sunbathing has been effective in treating some dermatologic conditions, such as atopic dermatitis.¹³ However, it may only be effective during certain months and at different latitudes—conditions that make UVB sun rays more accessible—particularly when treating psoriasis.¹⁴ Furthermore, sunbathing may not be as cost-effective in patients with average-severity psoriasis compared with conventional psoriasis therapy because

of the costs of travel to areas with sufficient UVB rays for treatment.¹⁵ Additionally, insurance status was related to which option was selected as the most cost-effective, as 29 (53.7%) of 54 uninsured participants chose sunbathing as the most cost-effective option, while only 92 (34.2%) of 269 privately insured patients selected sunbathing. Therefore, insurance status may be a factor for dermatologists to consider if a patient prefers a treatment that is cost-effective. Overall, dermatologists could perhaps consider guiding patients and optimizing their treatment plans based on the factors most important to the patients while understanding that costs and insurance status may ultimately determine the treatment option.

Limitations—Survey participants were recruited on Amazon Mechanical Turk, which could create sampling bias. Furthermore, these participants were representative of the general public and not exclusively patients on phototherapy, therefore representing the opinions of the general public and not those who may require phototherapy. Furthermore, given the nature of the survey, the study was limited to the adult population.

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