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RESEARCH LETTER

Home Phototherapy Improves Access to Dermatologic Care: A Novel Stakeholder Alliance to Facilitate Its Implementation

Fatima Bawany[1], Julie Ryan Wolff[1], Christopher T Ritchlin[2], Francisco Tausk[1,2]

[1]Department of Dermatology, University of Rochester Medical Center, Rochester, NY, USA; [2]Department of Medicine, University of Rochester Medical Center, Rochester, NY, USA

Correspondence: Francisco Tausk, Department of Dermatology, University of Rochester Medical Center, 601 Elmwood Ave., Box 697, Rochester, NY, 14642, USA, Email Francisco_Tausk@urmc.rochester.edu

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Introduction

Phototherapy is a standard treatment for dermatologic diseases such as psoriasis in patients with moderate to severe disease. Compared with alternative systemic therapies such as biologics, it has fewer side effects and costs, with comparable efficacy.[1] However, it often requires in-office treatments two to three times a week, resulting in a substantial patient burden, such as the inability to attend during office hours, lengthy travel times to the medical office, and a significant financial burden resulting from the high cost of treatment co-pays, that in the case of most commercial insurers, is equal to that of a physician specialist visit.

Home phototherapy can reduce many barriers to care. This study determined disease, quality-of-life, and treatment satisfaction outcomes from a home phototherapy program at our academic center involving all stakeholders' alliance (insurance carrier, instrument manufacturer, health providers, and hospital pharmacy).

Methods

We developed a home phototherapy program in conjunction with a major insurance carrier, the device manufacturer (Daavlin, Bryan, Ohio), and the hospital pharmacy.

Home Phototherapy Methods

1. Patients are seen at the dermatology clinic of the University of Rochester Medical Center, and the healthcare provider makes the determination to consider phototherapy based on the clinical assessment and disease characteristics.
2. Initial presentation of this procedure to the subject, and if in agreement to proceed, we educate the patient on benefits, goals, and expectations of this treatment, including expected time to improvement. We review possible side effects, such as burns, the need to reduce doses if they develop pinkness in the skin, and the instructions to contact us in case of adverse effects. If the face is not affected, they are instructed to place a pillowcase over it, always in the same position. If the face is to be exposed, we stress the requirement to wear goggles provided by the pharmacy. Time is allotted for any patient questions.
3. Following the education session, patients sign a consent form with detailed instructions and information that can be reviewed at home.
4. We then determine the phototherapy unit to be ordered. Either a 6-foot stand-up unit for the entire body (Series 7) or a flat panel (Series 1) for hands/feet treatment. The electronic order is placed to the pharmacy after determining the ideal starting dose based on Fitzpatrick skin type ranging from 125 mJ/cm^2 for skin type I to 400 mJ/cm^2 for

Received: 1 March 2023
Accepted: 27 April 2023
Published: 2 May 2023

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skin type VI, conveying this to the pharmacy and instructing an escalating dose of 10% each session (2 or 3 sessions per week and never two consecutive days).

5. Dedicated pharmacy personnel educated on phototherapy contact the insurance carrier and delivers and install the phototherapy unit in the patient's home. The insurer charges a 0–20% one-time copay and the total cost is markedly reduced due to bulk-purchasing by the pharmacy.
6. Upon delivery, the pharmacist reviews the operating instructions, dosing, and side effects with the patient. The subject is provided with an app (Daavlin) to calculate escalating doses and a document to log in every treatment and possible adverse effects. Patients are provided protection goggles, and males are given straps to cover their genitals.
7. Two days later, the pharmacist contacts the patient via telephone to review any problems, and this is repeated two weeks later and subsequently monthly.
8. The patients are scheduled to follow up with their dermatologist three months after initiating the home phototherapy.

Study Methods

In this cross-sectional cohort study (01/2019–02/2021, IRB approved 10/12/2020), patients were eligible if they met the following criteria: >18 years old, prescribed home phototherapy for a dermatologic disease, and able to give informed consent in English (telephone questionnaire only). This study complies with the declaration of Helsinki.

Demographics and disease courses were determined using medical records. A 12-question telephone survey ascertained device use, Perceived Global Impression of Severity,[2] quality-of-life (Skindex-mini),[3] and treatment satisfaction. Subgroup analyses were performed using Chi-square tests and Fisher's exact tests for categorical data and unpaired *t*-tests for continuous data.

Results

Table 1 summarizes patient demographics. The most common diseases were psoriasis and AD. Almost all patients (96.8%, n=61) received narrow-band ultraviolet B phototherapy. The survey response rate was 68% (n=43), and the sample was representative of the population.

Table 1 Demographics and Clinical Features of Study Cohort[a]

Variable	All (N = 63)	Survey Respondents (N = 43)	Non-Responders (N = 20)	*p*-value[b]
Sex, n (%)				0.4045
Male	23 (36.5)	14 (32.6)	9 (45.0)	
Female	40 (63.5)	29 (67.4)	11 (55.0)	
Race, n (%)				
White	56 (88.9)	41 (95.3)	15 (75.0)	
Black	2 (3.2)	0	2 (10.0)	
Other[c]	4 (6.3)	2 (4.7)	2 (10.0)	
Unknown	1 (1.6)	0	1 (5.0)	
Age at diagnosis (years)				0.2620
Mean (SD)	38.2 (17.3)	40.1 (18.6)	34.7 (14.3)	
Min/Max	7/73	9/73	7/57	

(*Continued*)

Table 1 (Continued).

Variable	All (N = 63)	Survey Respondents (N = 43)	Non-Responders (N = 20)	*p*-value[b]
Disease, n (%)				0.3625
Psoriasis	35 (55.6)	23 (53.5)	12 (60.0)	
Atopic dermatitis	14 (22.2)	11 (25.6)	3 (15.0)	
Other[d]	14 (22.2)	9 (20.9)	5 (25.0)	
Type of phototherapy used				>0.9999
UVA	2 (3.2)	2 (4.7)	0	
UVB	61 (96.8)	41 (95.3)	20 (100.0)	

Notes: [a]Data was analyzed using GraphPad Prism 9.2.0. with Chi-square tests and Fisher's exact tests for categorical data and unpaired *t*-tests for continuous data. [b]$p < 0.05$ was considered statistically significant. [c]Includes Hispanic/Latino and Asian. [d]Includes, vitiligo, lichen planus, lichen sclerosus, and dermatitis.

Table 2 describes the clinical features and questionnaire responses of the survey sample. Nearly 90% of patients endorsed improvement with phototherapy. Sixteen patients (37.2%) had used their device for ≥1 year. Five patients (11.6%) had not improved despite phototherapy (psoriasis n=2, AD n=2, lichen sclerosus n=1). Of them, only the patient with lichen sclerosus had used the device for ≥1 year. Of the remaining four patients, two experienced difficulties using the device, and one experienced side effects (n=1).

Table 2 Disease Course and Experiences of Survey Respondents (N = 43)

Variable	Frequency
Concomitant treatments at time of initiation of home phototherapy, n (%)	
Topical steroids	30 (69.8)
Topical non-steroidal medications	23 (53.5)
Non-biologic immunosuppressants	5 (11.6)
Biologic immunosuppressants	10 (23.3)
BSA prior to initiating home phototherapy, mean (SD)	15.8 (16.3)
Previously used in-office phototherapy, n (%)	13 (30.2)
Are you still using your phototherapy device? n (%)	
Yes	30 (69.8)
No	13 (30.2)
Frequency of device use in days per week, n (%)	
0	13 (30.2)
1 to 2	9 (20.9)
3 to 4	21 (48.8)
>4	0
Perceived Global Impression of Severity, mean (SD)[a]	2.72 (1.16)

(*Continued*)

Table 2 (Continued).

Variable	Frequency
Since starting phototherapy, do you feel your skin problem has:	
Improved, n (%)	38 (88.4)
Not changed, n (%)	4 (9.3)
Worsened, n (%)	1 (2.3)
Skindex-Mini: during the past week, how often have you been:[b]	
Bothered by symptoms of your skin problem, mean (SD)	2.98 (1.85)
Emotionally bothered by your skin problem, mean (SD)	2.12 (2.14)
Bothered by effects of your skin problem on your activities, mean (SD)	1.58 (1.94)
Experienced side effects from phototherapy since last visit, n (%)	8 (18.6)
Burn	5 (11.6)
Gastrointestinal side effects[c]	2 (4.7)
Erythema	1 (2.3)
Other	1 (2.3)
Reasons for selecting home instead of in-office phototherapy, n (%)	
Convenience/time saved	32 (74.4)
Distance to clinic	12 (27.9)
Cost/lower co-pay	10 (23.3)
Work/household responsibilities	9 (20.9)
Privacy	6 (14.0)
COVID-19 related concerns	6 (14.0)
Likelihood of recommending home phototherapy to others, mean (SD)[d]	8.84 (2.18)

Notes: [a]Perceived Global Impression of Severity was graded on a scale of 1 to 5 (1: clear, to 5: severe). [b]Skindex-Mini was graded on a scale of 1 to 6 (1: never, to 6: always). [c]Both of these patients described side effects from psoralen for PUVA. [d]Likelihood of recommending home phototherapy was graded on a scale of 0 to 10 (0: not at all, to 10: highly).

All subjects preferred home treatment to in-office treatment due to the reduced time, travel, and financial burden. Most patients preferred home phototherapy to biologics (74.4%, n=32), primarily due to concerns about biologic side effects (40.6%, n=13). Those who were undecided perceived both treatments as efficacious (100%, n=10).

A minority of patients endorsed difficulties using the device (13.9%, n=6) or side effects (18.6%, n=8). Thirteen patients (30.2%) were no longer using their device; common reasons for discontinuation were disease clearance (n=4), treatment dissatisfaction (n=3), difficulties using the device (n=2), and inability to adhere to the regimen (n=2).

Discussion

Our data reaffirms that home phototherapy is efficacious and reduces patient burden.[4] Our compliance and clinic follow-up rates were reassuring. However, several patients reported side effects or difficulties using their devices despite in-person and telephone follow-ups, suggesting that improvements can be made in monitoring. Study limitations were the relatively small sample size, retrospective design, and racially homogenous population.

In-office phototherapy can be burdensome to patients and staff due to the numerous appointments, transportation, co-pays, staffing, and equipment.[5] However, home units often have limited or complex insurance coverage. In one study, less than half of patients filled their prescriptions for home phototherapy due to high out-of-pocket costs.[6] In our program, the expense to the insurer was the device cost. In contrast, the cost of biologic medications is approximately $60,000–$70,000/year (data.medicaid.gov). This, along with the possible side effects of biologics, yields a strong argument for expanding home phototherapy services in lieu of or prior to trialing biologics. A study performed in 2018[7] reported that the 3-year cost of biologics at that time ranged between $109,066 and $180,718; newer ones, such as risankizumab, carry a wholesale acquisition cost of $236,815 (https://www.skyrizi.com/psoriasis-psoriatic-arthritis/cost-and-savings), compared to a 3-year cost of home phototherapy between $700 and $2400. Paradoxically, most insurance carriers systematically reject home phototherapy, favoring the utilization of biologics in spite of the fact that home phototherapy would result in substantial savings.

Conclusion

We have developed a home phototherapy program that is effective, safe, and economical for insurers and patients, and believe that this successful program should be replicated by other medical institutions and encourage insurance carriers to include home phototherapy in their covered plans. A large-scale, pragmatic, longitudinal study is currently being funded by PCORI comparing patient outcomes between home phototherapy and in-office phototherapy (https://www.pcori.org/research-results/2017/comparing-home-versus-clinic-based-phototherapy-treatment-psoriasis-lite-study).

Ethics and Consent

Informed consent was obtained from all patients who participated in the questionnaire.

This study was approved by the University of Rochester Medical Center IRB.

Acknowledgment

The abstract of this paper was presented at the 2022 Annual Meeting of the American Academy of Dermatology as a poster presentation with interim findings. The poster's abstract was published in "Poster Abstracts" in the J Am Acad Dermatol, 2022, Vol 87(3), pAB65

Funding

There is no funding to report.

Disclosure

The authors report no conflicts of interest in this work.

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