Published in final edited form as:

Br J Dermatol. 2015 September ; 173(3): 831–834. doi:10.1111/bjd.13736.

Sunscreen use in cutaneous lupus erythematosus patients

E.L. Gutmark¹, D.Q. Lin¹, I. Bernstein², S.Q. Wang³, and B.F. Chong¹

¹Department of Dermatology, University of Texas Southwestern Medical Center, Dallas, TX

²Department of Clinical Sciences, University of Texas Southwestern Medical Center, Dallas, TX

³Division of Dermatology, Memorial Sloan Kettering Cancer Center, New York, NY

Keywords

cutaneous lupus erythematosus; sunscreen; photoprotection; ultraviolet radiation; survey; patient education

Dear Editor, Because ultraviolet (UV) radiation is a well-documented environmental trigger, cutaneous lupus (CLE) patients are advised to engage in photoprotective practices, including sunscreen use. Despite numerous studies demonstrating the efficacy of sunscreens,^{1,2} CLE patients have not fully embraced sunscreen use. Daily sunscreen use was reported only in 23.1% of CLE patients in Ireland.³ Our group previously found that 59% of CLE patients used sunscreen “often” or “always,” although those terms were not defined.⁴ The reasons for suboptimal sunscreen use in CLE patients are not clear.

A cross-sectional survey (Supplemental Fig. 1) to assess frequency, patterns, and barriers to sunscreen use was administered by phone, mail, e-mail, or in person to patients with CLE enrolled in the University of Texas Southwestern (UTSW) CLE Registry in Dallas, Texas, from January 2012 to April 2013. The inclusion criterion was patients with clinicopathological diagnoses of CLE. Exclusion criteria included patients who were younger than 18 years old, or had a history of drug-induced CLE or another photosensitive disease. This study was approved by the UTSW Institutional Review Board. Patient characteristics outlined in Table 1 were obtained from the UTSW CLE Registry database. Those who reported using sunscreen for 7 days and 0 days in the last week were designated as daily sunscreen CLE users and non-sunscreen CLE users, respectively. Sun protection habits (SPH) scores were determined by calculating the sum of responses on frequency of other photoprotective practices.^{5,6} Questions related to potential barriers to sunscreen use were assessed using a 4-point polychotomous scale (1=strongly agree, 2=agree, 3=disagree,

Please send correspondence and reprint requests to: Benjamin F. Chong, MD, University of Texas Southwestern Medical Center, Department of Dermatology, 5323 Harry Hines Blvd., Dallas, TX 75390-9069, Phone: (214) 648-2948, Fax: (214) 648-5559, ben.chong@utsouthwestern.edu.

Conflicts of interest: Dr. Chong is an investigator for Daavlin Corporation. Dr. Wang serves as an advisor for Johnson and Johnson, L’Oreal, and Avon.

The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.

4=strongly disagree). A statement was considered a barrier if the response was “strongly agree” or “agree.”

Patient characteristics were summarized with frequency counts and percentages. Comparisons of continuous and categorical variables between daily sunscreen CLE users and non-sunscreen CLE users were performed using ANOVA and χ^2 tests, respectively. Comparisons of ordinal measurements were performed using Mann Whitney U tests. Multivariate analyses were performed using predictor variables with univariate analysis p-values < 0.10, and gender as independent variables. Statistical analyses were performed using SAS software version 9.3 (SAS Institute, Cary, NC).

100 out of 148 invited CLE patients completed the questionnaire. Their demographics and disease characteristics were listed in Table 1. There were 32 (32%) daily sunscreen and 40 (40%) non-sunscreen CLE users. Of the 60 who used sunscreen, 50% and 63% of CLE patients re-applied sunscreen on a daily basis or when outside for more than one hour, respectively. 33% put sunscreen on at least 30 minutes before going outdoors. Univariate analyses revealed that daily sunscreen CLE users were more likely to be married than non-sunscreen CLE users ($p=0.007$). Non-sunscreen CLE users reported annual incomes less than \$10,000 more often than daily sunscreen CLE users ($p=0.01$). Daily sunscreen CLE users also had significantly higher rates of completing a college or above education than non-sunscreen CLE users ($p=0.02$). Daily sunscreen CLE users more often sought other forms of photoprotection than non-sunscreen CLE users ($p=0.01$). Multivariate analyses demonstrated that CLE patients who were married ($p=0.04$) or had college or above education ($p=0.03$) were highly associated with daily sunscreen use (Table 1). Other disease characteristics and demographic variables in Table 1 showed no significant differences between the groups in the univariate and multivariate analyses.

Forgetfulness was cited as the most common reason for not using sunscreen (42%) followed by the patients' belief that sunscreens were ineffective in preventing lupus flares (41%) and by inherent features of sunscreens such as greasiness (39%). Non-sunscreen CLE users were more likely than daily sunscreen CLE users to “strongly agree” or “agree” that forgetfulness ($p=0.0002$), inconvenience ($p=0.006$), and perception of futility in preventing lupus flares ($p=0.03$) were reasons not to use sunscreen (Table 2).

The low percentage of CLE patients using sunscreen daily underscores the need for providers to counsel CLE patients that optimal photoprotection requires daily sunscreen application. Moreover, we found suboptimal rates of CLE patients re-applying daily and wearing sunscreen 30 minutes before going outside. Our data highlights gaps in knowledge in CLE patients, who may perceive that once daily sunscreen application is sufficient, and applying sunscreen immediately provides photoprotection. Such inadequate practices could mislead patients to conclude that sunscreens are ineffective in preventing lupus flares.

Marital status was a significant feature in distinguishing daily sunscreen and non-sunscreen CLE users in both univariate and multivariate analyses. Given that non-sunscreen CLE users more often identified forgetfulness as a reason not to wear sunscreen, we hypothesize that daily sunscreen CLE users may have constant reminders from significant others to apply

Author Manuscript

sunscreen. Although the survey did not ask CLE patients about their sources of accountability, future projects seeking ways to increase the rate of sunscreen use in CLE patients can include this question.

Author Manuscript

More non-sunscreen CLE users had a lower level of formal education than daily CLE users, likely contributing to the greater percentage of non-sunscreen CLE users citing their belief in sunscreen inefficacy as a barrier. Because this misperception of sunscreens may contribute to decreased sunscreen use in CLE patients, this demonstrates a need for patient education to address this knowledge gap. Previous studies have shown that photo-exacerbated CLE flares can be delayed up to several weeks after UV radiation.⁷ CLE patients may not connect the two events because of the temporal delay, which may explain why patients may feel that sunscreens are ineffective.

Author Manuscript

The two groups were analyzed to see if one form of communication influenced reporting of sunscreen frequency. Despite a nearly significant trend for non-sunscreen users to be interviewed by phone, a reporter bias would have resulted in the opposite case of patients over-estimating their sunscreen frequency by phone to satisfy providers' expectations. To minimize this bias, we used personnel not directly involved with their medical care to conduct interviews.

Author Manuscript

Our finding that only a minority of CLE patients consistently wears sunscreen implies an opportunity to develop more effective patient education methods. Practitioners are encouraged to take time to educate each CLE patient about the importance of sunscreen use. In addition, counseling patients about appropriate patterns of sunscreen use and emphasizing that there is a potential delay between UV exposure and CLE skin flares would potentially enhance sunscreen use in this at-risk population.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgments

Grant Support: The research reported in this publication was supported by the National Institute of Arthritis and Musculoskeletal and Skin Diseases of the National Institutes of Health under Award Number K23AR061441.

We are indebted to Rose Cannon for assisting in the manuscript preparation. We would like to thank Andrew Kim, Daniel Grabell, Julie Song, Rebecca Vasquez, and Sandra Victor for their assistance in the compilation of patient data.

Abbreviations

APIF	Analogue Pain Itch Fatigue
CLASI	Cutaneous Lupus Activity and Severity Index
CLE	cutaneous lupus erythematosus
SLE	systemic lupus erythematosus
SLEDAI	Systemic Lupus Erythematosus Disease Activity Index

SPF	sun protection factor
SPH	sun protection habits
UTSW	University of Texas Southwestern
UV	ultraviolet

References

1. Kuhn A, Gensch K, Haust M, et al. Photoprotective effects of a broad-spectrum sunscreen in ultraviolet-induced cutaneous lupus erythematosus: a randomized, vehicle-controlled, double-blind study. *J Am Acad Dermatol*. 2011; 64:37–48. [PubMed: 21167404]
2. Callen JP, Roth DE, McGrath C, et al. Safety and efficacy of a broad-spectrum sunscreen in patients with discoid or subacute cutaneous lupus erythematosus. *Cutis*. 1991; 47:130–2. 5–6. [PubMed: 2001634]
3. Cusack C, Danby C, Fallon JC, et al. Photoprotective behaviour and sunscreen use: impact on vitamin D levels in cutaneous lupus erythematosus. *Photodermatol Photoimmunol Photomed*. 2008; 24:260–7. [PubMed: 18811868]
4. Yang SY, Bernstein I, Lin DQ, et al. Photoprotective habits of patients with cutaneous lupus erythematosus. *J Am Acad Dermatol*. 2013; 68:944–51. [PubMed: 23360867]
5. Glanz K, Lew RA, Song V, et al. Factors associated with skin cancer prevention practices in a multiethnic population. *Health Educ Behav*. 1999; 26:344–59. [PubMed: 10349572]
6. Geller AC, Glanz K, Shigaki D, et al. Impact of skin cancer prevention on outdoor aquatics staff: the Pool Cool program in Hawaii and Massachusetts. *Prev Med*. 2001; 33:155–61. [PubMed: 11522155]
7. Sanders CJ, Van Weelden H, Kazzaz GA, et al. Photosensitivity in patients with lupus erythematosus: a clinical and photobiological study of 100 patients using a prolonged phototest protocol. *Br J Dermatol*. 2003; 149:131–7. [PubMed: 12890206]

Table 1
Univariate and multivariate analyses of predictor variables in daily sunscreen and non-sunscreen CLE users

Predictor Variable	All CLE patients (N=100)	Daily sunscreen CLE users (N=32)	Non-sunscreen CLE users (N=40)	Univariate p-value	Multivariate odds ratio	Multivariate p-value
Female sex (N, %)	85 (85.0)	29 (90.6)	32 (80.0)	0.33	5.45	0.11
Race (N, %)						
White	37 (37.0)	14 (43.8)	10 (25.0)	0.23	N/A	N/A
Black	46 (46.0)	11 (34.4)	23 (57.5)			
Asian	6 (6.0)	3 (9.4)	2 (5.0)			
Hispanic	11 (11.0)	4 (12.5)	5 (12.5)			
Age (median (years), IQR)	46.3 (37.3–55.9)	41.4 (34.4–52.3)	48.3 (42.1–56.2)	0.42	N/A	N/A
Marital status (N, %)						
Non-married	59 (64.8)	16 (50.0)	32 (80.0)	0.007	5.00	0.04
Married	32 (35.2)	16 (50.0)	8 (20.0)			
Education (N, %)						
High school or below	37 (42.5)	7 (25.0)	18 (54.6)	0.02	0.21	0.03
College or above	50 (57.5)	21 (75.0)	15 (45.4)			
Income (N, %)						
<\$10K	30 (35.3)	4 (14.9)	15 (46.9)	0.01	0.94	0.89
\$10–\$50K	29 (34.1)	14 (50.0)	7 (21.9)			
>\$50K	26 (30.6)	10 (35.7)	10 (31.3)			
Smoking status (N, %)						
Current	28 (28.9)	9 (29.0)	10 (26.3)	0.20	N/A	N/A
Ever	22 (22.7)	3 (9.7)	10 (26.3)			
Never	47 (48.4)	19 (61.3)	18 (47.4)			
Amount of daily sun exposure (N, %)						
<1 hour	63 (64.3)	18 (56.3)	25 (65.8)	0.58	N/A	N/A
2–4 hours	32 (32.7)	13 (40.6)	11 (29.0)			

Predictor Variable	All CLE patients (N=100)	Daily sunscreen CLE users (N=32)	Non-sunscreen CLE users (N=40)	Univariate p-value	Multivariate odds ratio	Multivariate p-value
>4 hours	3 (3.1)	1 (3.1)	2 (5.3)			
Fitzpatrick skin type (N, %)						
Light (Type I/II)	22 (24.4)	8 (27.6)	8 (22.9)	0.06	1.13	0.58
Medium (Type III/IV)	37 (41.1)	15 (51.7)	10 (28.6)			
Dark (Type V/VI)	31 (34.4)	6 (20.7)	17 (48.6)			
Disease duration (median (years), IQR) *	5.8 (1.7–12.9)	5.8 (1.5–9.2)	5.4 (2.1–14.4)	0.82	N/A	N/A
Flares/year (N, %)						
Few (0–2)	53 (53.5)	18 (58.1)	21 (52.5)	0.87	N/A	N/A
Moderate (3–5)	26 (26.3)	7 (22.6)	11 (27.5)			
Many (>5)	20 (20.2)	6 (19.4)	8 (20.0)			
Positive history of SLE (N, %)	57 (57.0)	17 (53.1)	24 (60.0)	0.56	N/A	N/A
Positive history of photosensitivity (N, %)	81 (81.0)	26 (81.3)	30 (75.0)	0.53	N/A	N/A
Number of lupus medications (median, IQR)	2.0 (1.0–3.0)	2.0 (1.0–2.0)	2.0 (1.0–3.0)	0.93	N/A	N/A
CLE subtype (N, %)						
Acute	12 (12.0)	4 (12.5)	6 (15.0)	0.93	N/A	N/A
Subacute	14 (14.0)	5 (15.6)	5 (12.5)			
Chronic	74 (74.0)	23 (71.9)	29 (72.5)			
CLASI activity score ** (median, IQR)	2.0 (1–4.3)	2.0 (0.5–4)	2.0 (1.3–4.8)	0.76	N/A	N/A
CLASI damage score ** (median, IQR)	5.5 (2.0–13.0)	3.0 (1.0–6.0)	12.0 (6.5–13.0)	0.14	N/A	N/A
SLEDAI score ** (median, IQR)	0.0 (0–2.0)	0.0 (0–2.8)	0.0 (0–2.0)	0.46	N/A	N/A
SPH score (median, IQR)	13.0 (10.0–15.3)	15.0 (12.0–16.0)	11.5 (8.0–14.0)	0.01	0.95	0.57

* Disease duration data were only available for 83 CLE patients (including 28 daily sunscreen CLE users and 32 non-sunscreen CLE users).

** CLASI and SLEDAI scores were only available for 39 CLE patients (including 15 daily sunscreen CLE users and 9 non-sunscreen CLE users) within thirty days of survey data.

Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript

Abbreviations: CLASI = Cutaneous Lupus Activity and Severity Index; CLE = cutaneous lupus erythematosus; SLE = systemic lupus erythematosus; SLEDAI = Systemic Lupus Erythematosus Disease Activity Index; SPH = sun protection habits.

Table 2

Barriers to sunscreen use

Barriers	All CLE patients	Daily sunscreen CLE users	Non-sunscreen CLE users	p-value
Expense (N, %)	24 (24.2)	5 (16.1)	9 (22.5)	0.50
Inherent features of the sunscreen (e.g. greasy, smelly, sticky, white residue) (N, %)	38 (38.8)	13 (41.9)	14 (35.9)	0.61
Desire for a tan (N, %)	18 (18.6)	6 (20.0)	6 (15.0)	0.58
Forgetfulness (N, %)	42 (42.4)	5 (16.3)	24 (60.0)	0.0002
Inconvenience (N, %)	27 (27.6)	3 (9.7)	15 (38.5)	0.006
Irritation (N, %)	15 (15.5)	4 (13.3)	5 (12.8)	0.95
Lack of efficacy in protecting against lupus flares (N, %)	40 (40.8)	6 (19.4)	17 (43.6)	0.03

Abbreviations: CLE = cutaneous lupus.